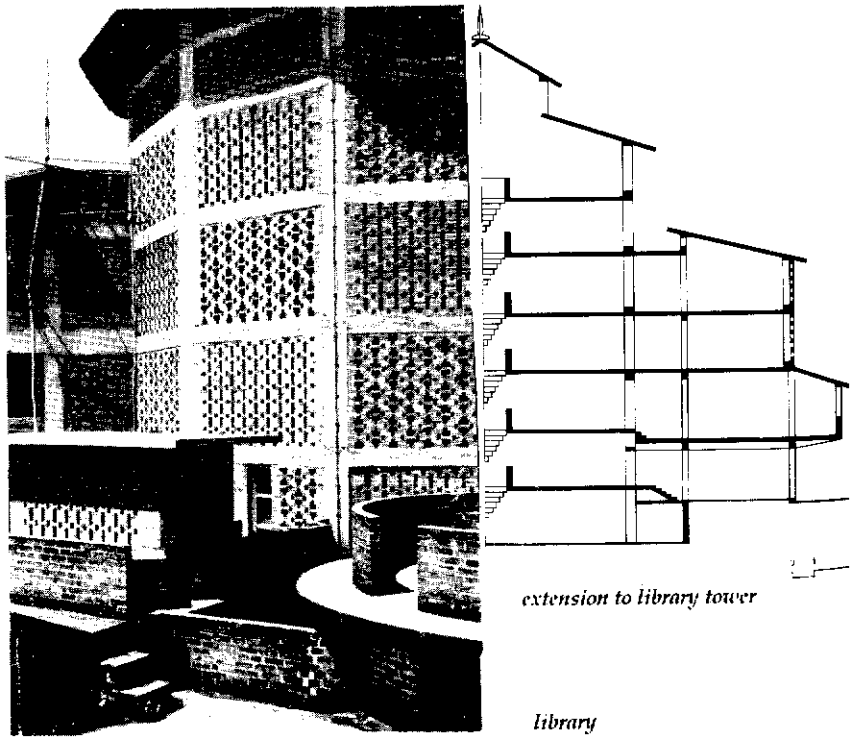
Centre for Development Studies

Ulloor, Trivandrum, 1971

While the greater part of Baker's professional life has been devoted to the making of houses, he has also dealt with commissions of public and institutional nature. In 1967, when he was asked to design a centre for research in applied economics in Ulloor, a suburb of Trivandrum, Baker expressed his building ideas in one convincing sweep in, what is today, the most important project of his career. The significance of this assignment had less to do with size and budget, than with the idea of exhibiting a range of concepts applied to buildings of varying functions, scale and dimensions.

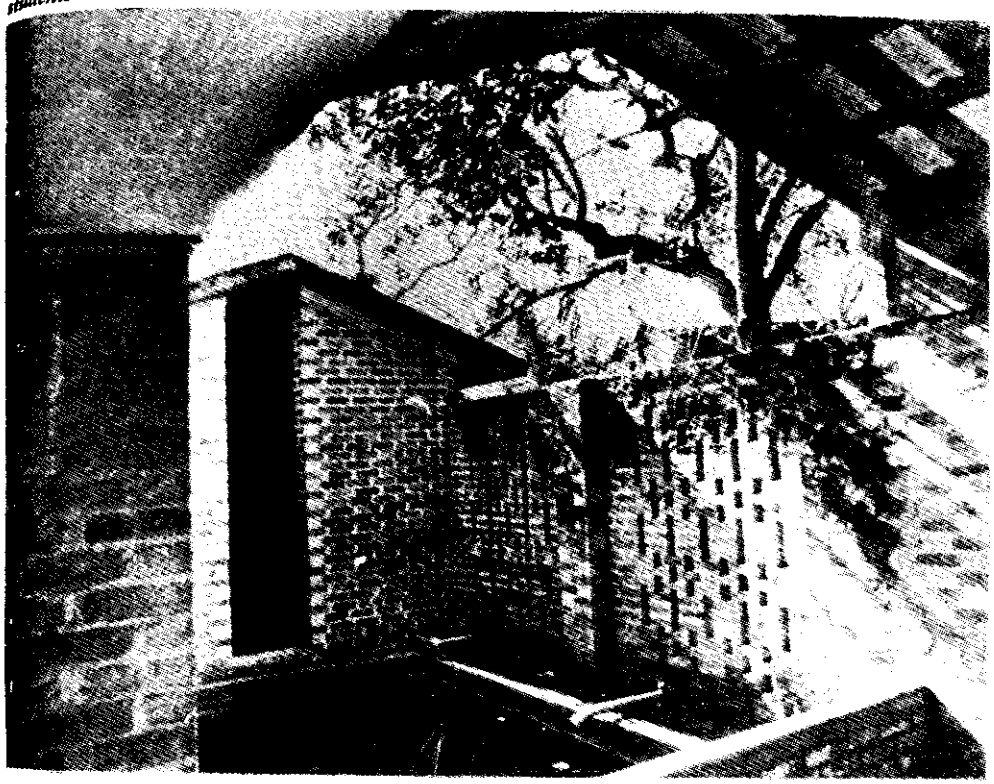
An area of nine acres accommodates administrative offices, a computer centre, an amphi-theatre, a library, classrooms, housing and other components of an institutional design.



extension to library tower

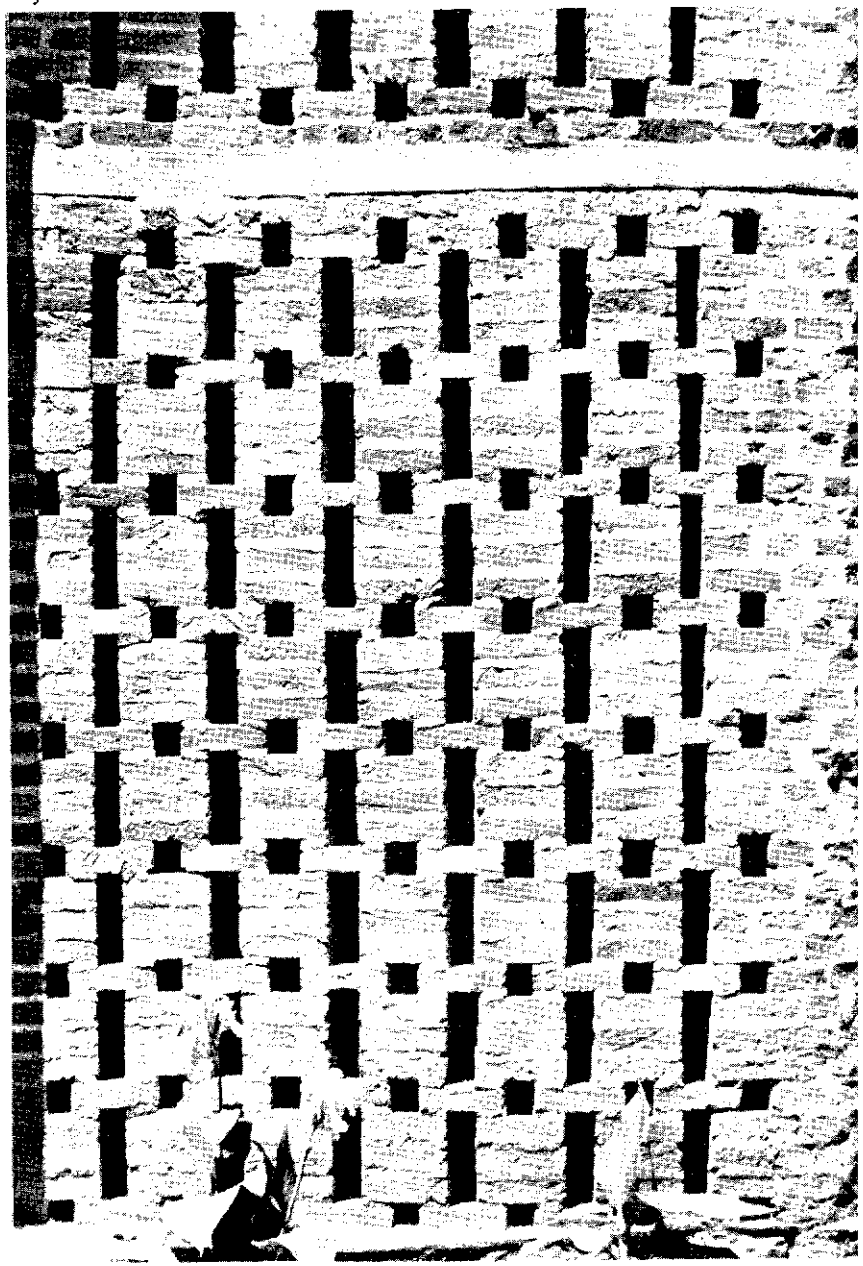
library

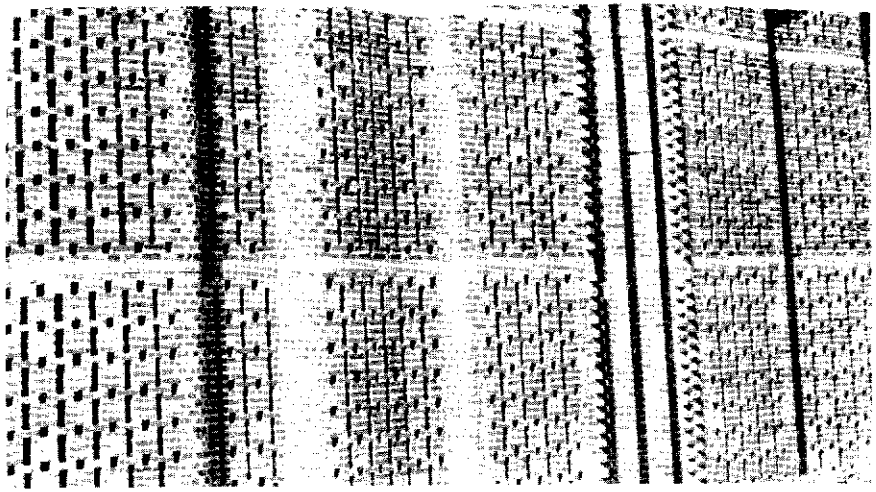
students' canteen



Baker's expertise was required not merely to make this into a cost-effective complex, but to provide a setting with an image consistent with its development-conscious goals. On a hillside, overlooking paddy fields, the site rises in a difficult gradient of rocky soil up to the crest of a hill. Here, at the summit, the library dominates the centre with a seven-storey tower; the administrative offices and classrooms are scattered in a randomness determined by each one's position on the slope. However, the buildings remain tightly connected through corridors that snake upwards to the library along breezy walkways and landscaped courts. A four-storey student hostel is set apart from this central complex across an informal amphi-theatre fashioned from excess building material, and made by merely consolidating the contours. Further down is a students' canteen and a girls' hostel. At the far end, near the entrance

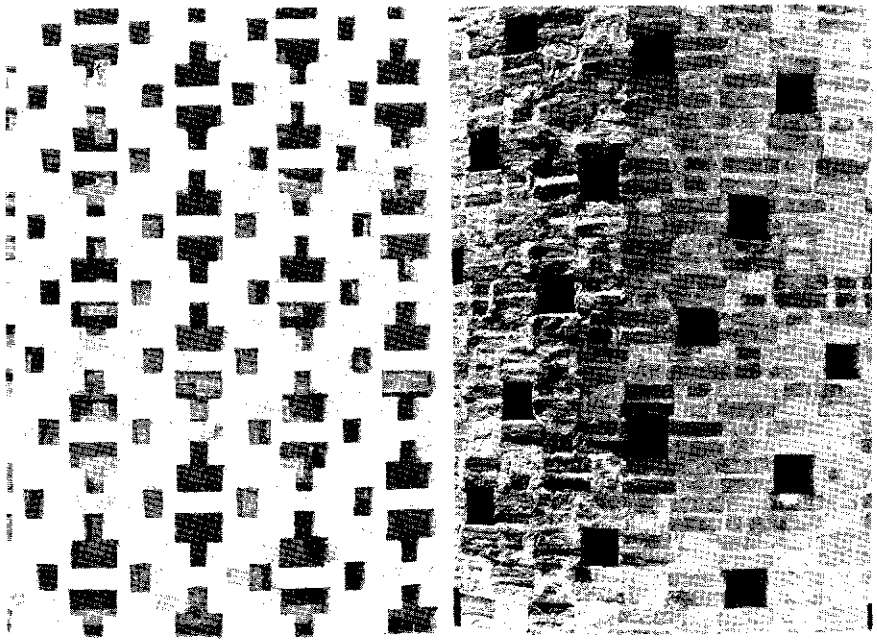
jali details





gate, are located varying densities of staff housing.

Building textures, configurations and spanning elements demonstrate Baker's easy manipulation of brick, all of which were made close to the site and fired with locally-available coconut palm wood. All



surfaces, whether inside or out, in the dormitory or classroom, are exposed to patterns showing varying bonding techniques and *jali* work. Openings are arched, corbelled or spanned with brick lintels. The same attitude of experimentation is seen in walls that are stepped, curved or folded for added strength; wall thicknesses change on different floors, depending on the loading and requirement.

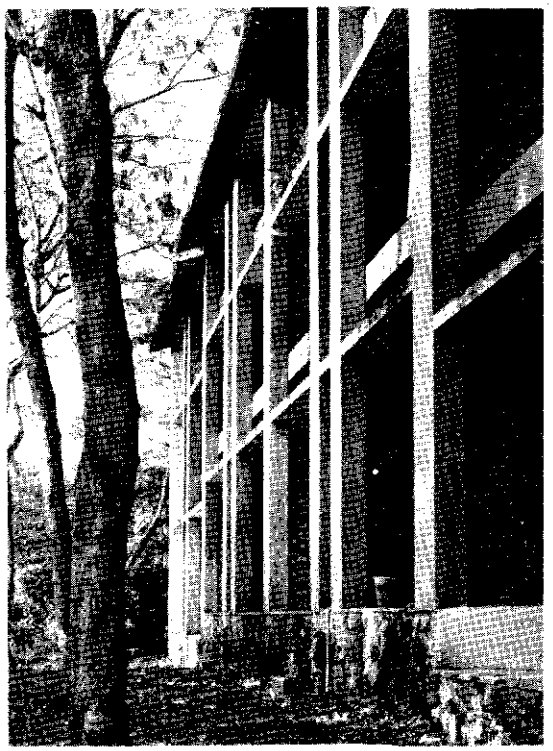
In Baker's buildings, heights are kept deliberately low and much below the tree-line. The height of the coconut palm had once provided an unwritten restriction for traditional buildings in Kerala, and Baker has rigorously conformed to this limit. Even in his institutional complexes, the land is rarely exploited to create man-made geometries or monumental axes and relationships. At the Centre all buildings are located along the slope of the hill, taking their shapes from the disposition of the land. Connections between them are along brick-walkways lined with lights having brick supports.

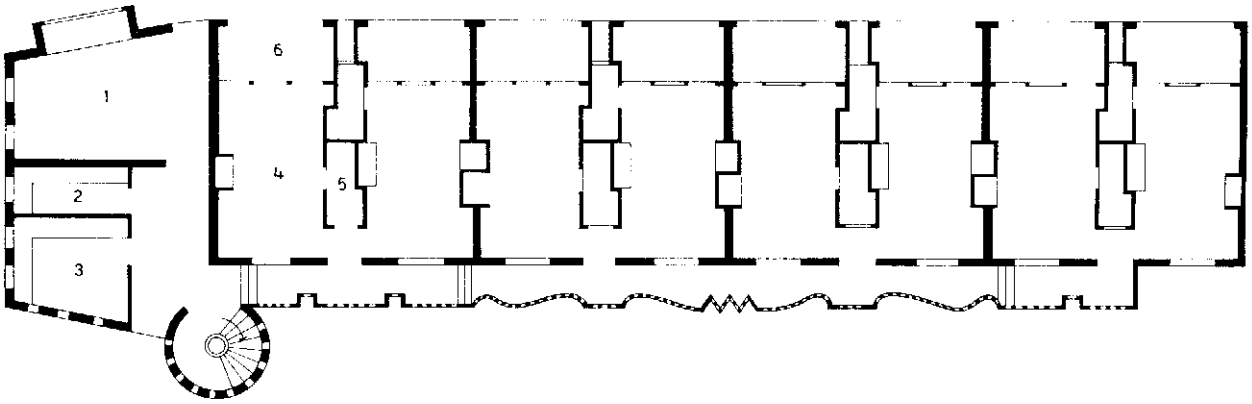
Men's Hostel

Centre for Development Studies

That the architecture can demonstrate, in a direct and practical way, the economic goals of an institute, is seen in the simplified design of the specific buildings on the campus of the Centre for Development Studies. In the men's hostel this economy is expressed in the organization of the plan, the nature of the construction and the materials used.

Eight rooms in a single file opening onto a veranda, and four stacked floors give a formidable linear shape to the plan. Each room is entered simply down a rear corridor built into the shared walls. This inordinately regimented organization is offset by the playfulness of the circulation and the entrance block—both of which move away from an excessive rectilinearity into the magical realm of curved walls, circular staircases and deep-set wall-niches. Though the composition at a close range



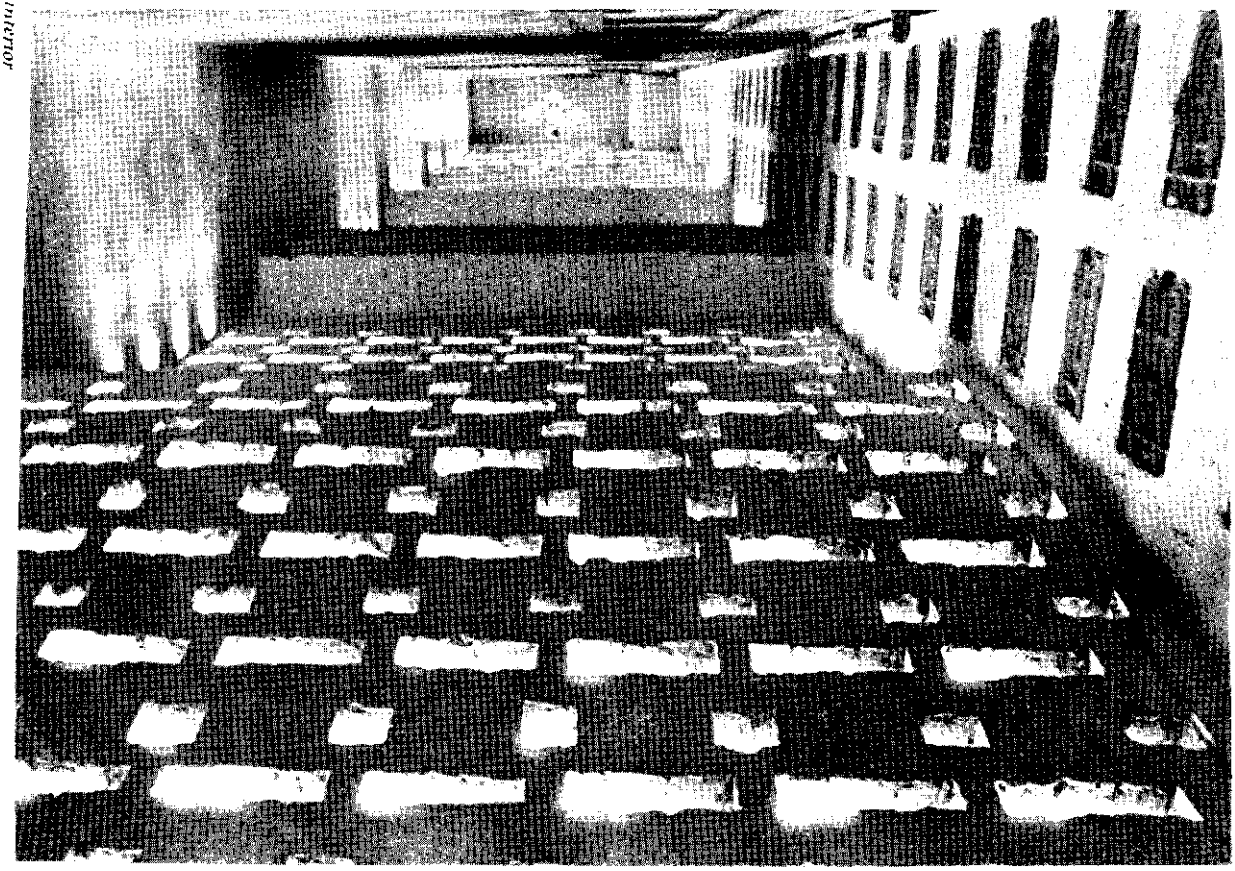


GROUND FLOOR PLAN (TYPICAL)

0 1 2 5m

1 LOUNGE
2 STORE
3 UTILITY
4 BEDROOM
5 TOILET
6 SITOUT

interior



makes for startling contrasts of light and shade, Baker's justification remains purely structural and economic, 'I was very keen to demonstrate the use of four-and-a-half inch thick load-bearing wall. When such a wall is taken to four storeys the curves and circles give it that added stiffness.'

Local problems of environmental degradation led Baker to experiment with materials as well. He says, 'In those days bricks were plentiful, well burnt and reasonably inexpensive. Unfortunately in Kerala, bricks are fired with wood, which led to forest destruction, so I gave preference to fuel-free materials, like stone laterite and mud.'

Random rubble mixed in lime *surkhi* mortar (lime manufactured from sea shells on the site) was used in the construction of the foundation; and load-bearing brick was used in the super structure. All slabs are of filler tiles, the flooring a mixture of local quarry tiles, and the windows of jackwood. Plastering is found only in the bathrooms—all the other surfaces being either exposed or whitewashed. The circular stair tower incorporates pre-cast stair treads using filler slab and bamboo reinforcement.

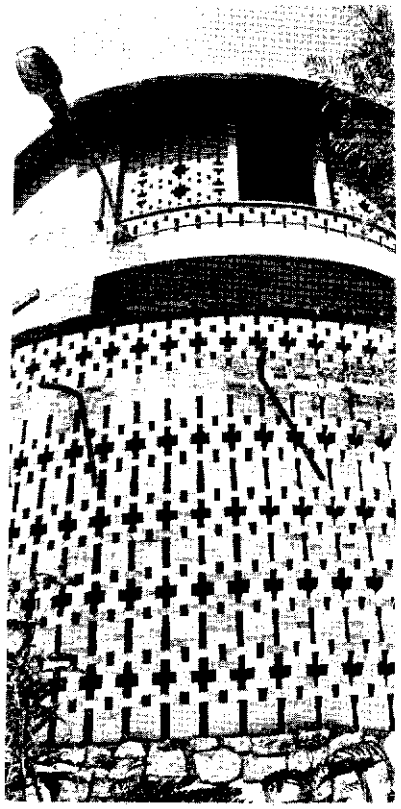
Women's Hostel

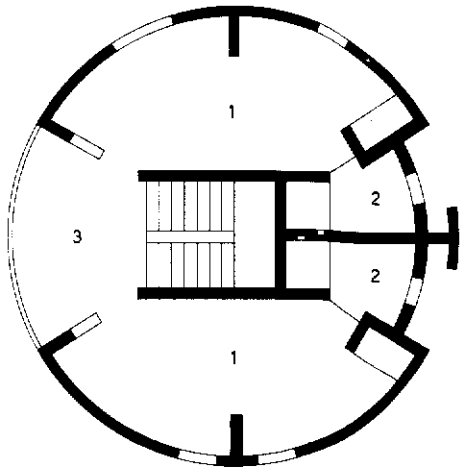
Centre for Development Studies

Explaining how this building came up, Baker says, 'When we started building the Centre there were not many women on the faculty who needed accommodation. So the first women's hostel plan was a small cylindrical building, three storeys high. But an enlightened establishment like the Centre soon had a lot of women and the original plan was not enough to house them all. So we built another adjoining hostel on a rather restricted site.'

The rooms, like those of the men's hostel, have the rigid layout of undifferentiated rectangles, opening into the privacy of a forest behind the building. But where Baker had provided the residual spaces of hostel

the circular house

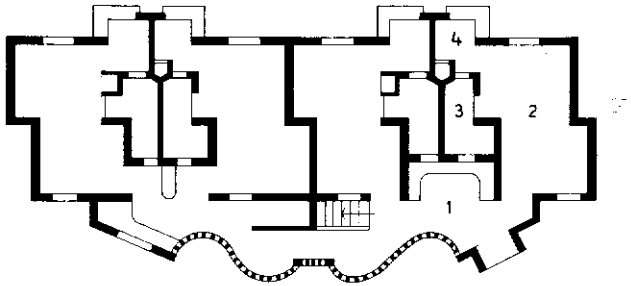




TYPICAL FLOOR PLAN

1 ROOM
2 TOILET
3 BALCONY

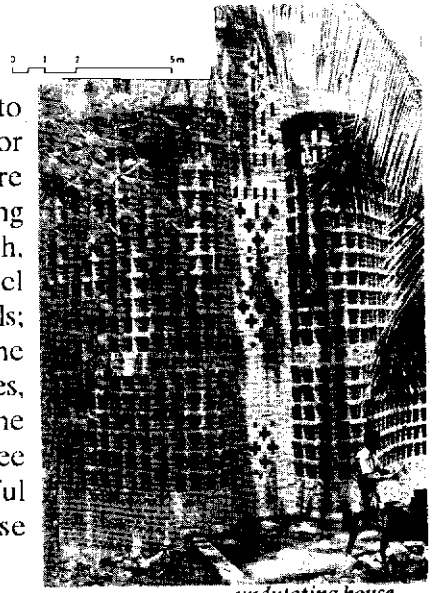
living as an end block in the men's building, the design here takes on an entirely new spatial dimension. Says Baker, 'This time the room, the balcony and the staircase plan were much more orthodox—but we made the usual connecting corridors very unorthodox by enclosing them in *jali* walls of rather florid building shapes.'



GROUND FLOOR PLAN (TYPICAL)

1 FOYER
2 ROOM
3 TOILET
4 BALCONY

The wall forming the circulation to the room is curved not merely for structural stiffness, but the curves are made unduly generous and sweeping so as to incorporate, in their breadth, all the spaces for an interactive hostel life. Low seats are built into the walls; kitchen counters and sinks follow the *jali* surfaces, dropping built-in tables, work areas and ironing boards. The spatial playfulness achieves a degree of useful purpose with the skilful sculpting of functions into these spaces.



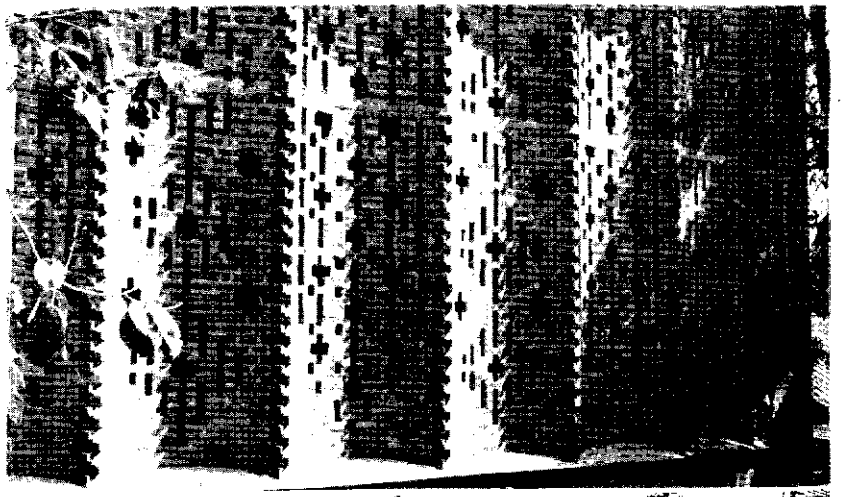
undulating house

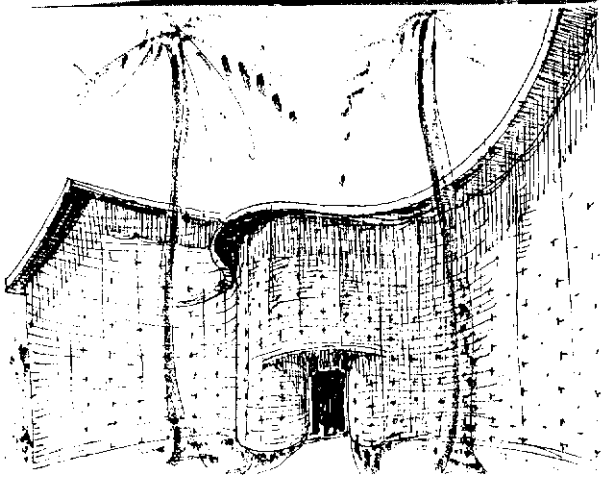
Computer Centre

Centre for Development Studies

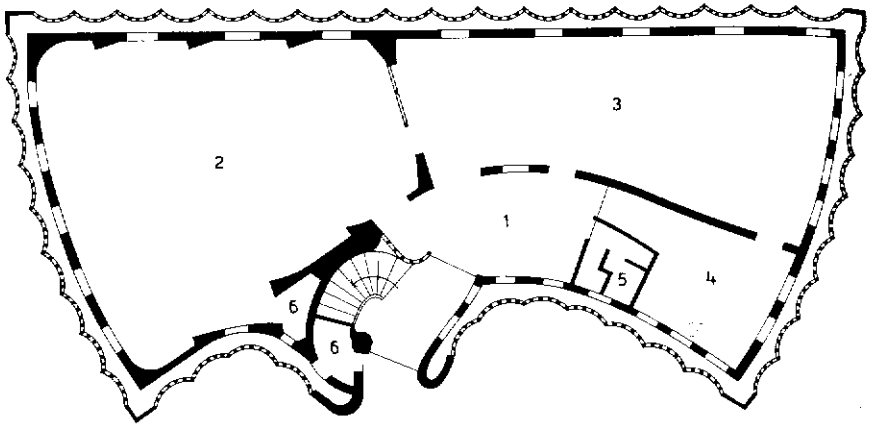
Later, Baker was approached to design the new premises to accommodate a computer at the Centre. How does a setting, designed on the principle of open lattice wall planning, breezeways and built of natural brick and stone, allow for the introduction of electronic sophistication, and the strict environmental controls required for a computer facility?

exterior wall details





rambling curves of the first sketch

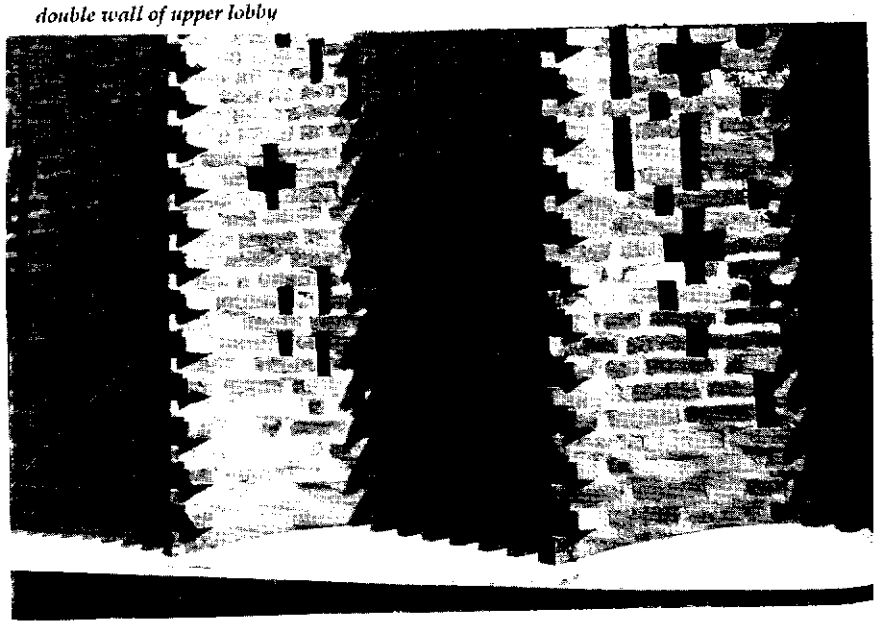


GROUND FLOOR PLAN

0 1 2 5m

1 FOYER
2 CLASSROOM
3 WORK AREA
4 OFFICE
5 TOILET
6 STORE

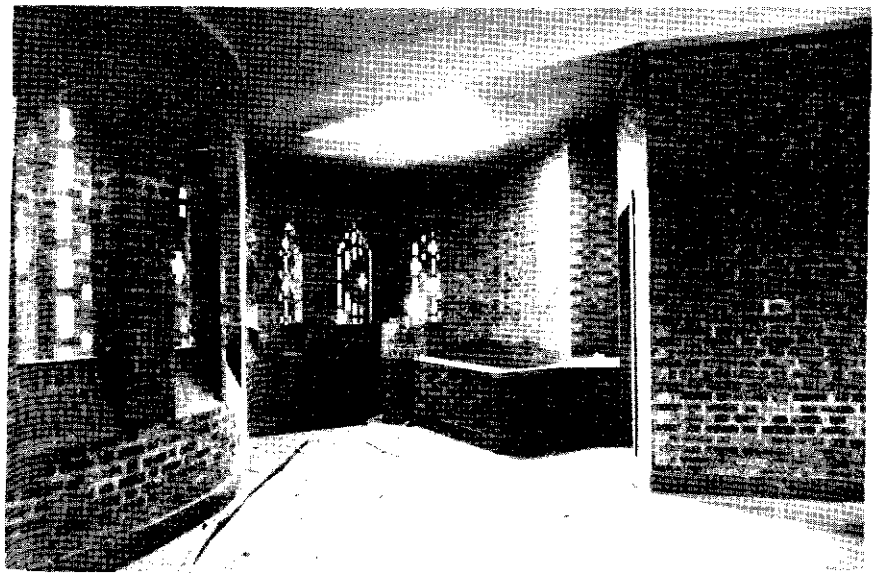
double wall of upper lobby



For Baker this was a double-edged problem, for the solution not only called for a simple resolution of the requirements but also an appropriate one fitting in naturally and harmoniously with the elevations of the twenty-five-year-old institution.

Baker's answer was a double-walled building with an outer surface of intersecting circles of brick *jalis* which followed the design of the main academic block, while the internal shell fulfilled the constraints and controls necessary for a computer laboratory. The space between the two walls accommodated the secondary requirements for offices and storage areas.

The two storey-high outer wall of single-brick thickness is stiffened by a series of intersecting circle segments; the mid-level slab is also fused into it for additional support. The pattern of perforations, unrelieved across the four faces of the building are like computer punch-outs and so suggestive of the functions they house. Larger corbelled window-openings of the inner wall control the diffused light of the outer wall and create a continuous glare-free atmosphere. A low entrance of the perforated wall cuts into the centre and directs the visitor up into a lobby lit by a skylight. The roof is a folded concrete slab.

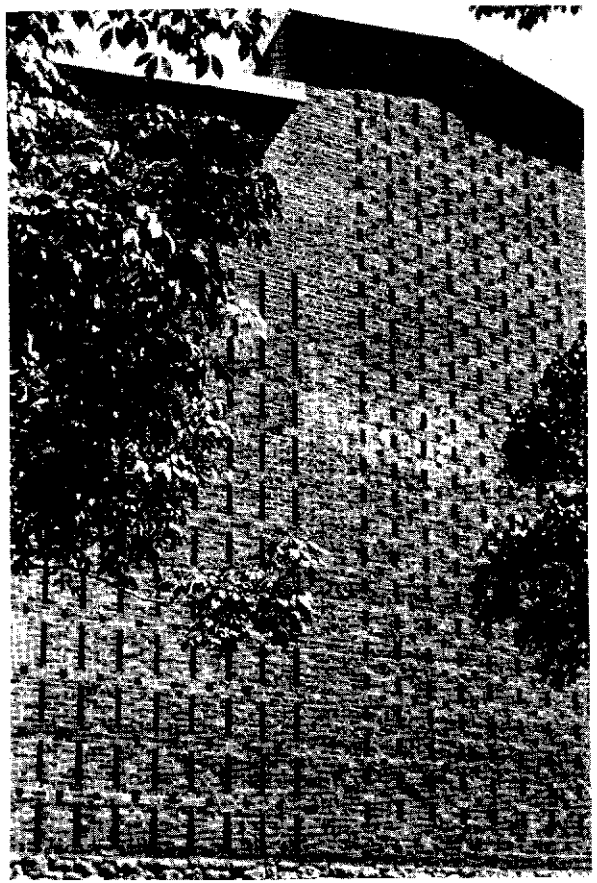


Loyola Chapel and Auditorium

Sreekarayam, 1971

On a small college campus, on the outskirts of Trivandrum, is another group of Baker's buildings, built on the scale of the Centre for Development Studies. Though the site was not planned and developed entirely by Baker, he designed individual projects such as dormitories, classrooms, field-house and larger ceremonial structures of a collective nature.

The Loyala complex contains a high school and a post-graduate complex, both sharing a common chapel and an auditorium. It was here



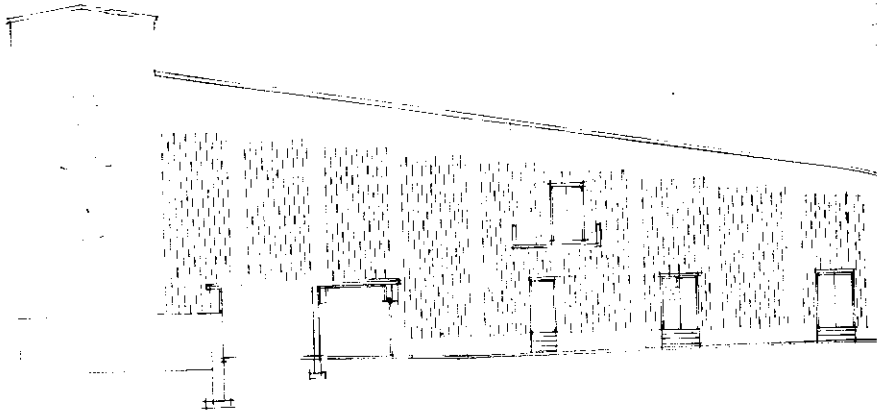
windowless cavity wall: the wall is double with a cavity between the two skins

Loyola Chapel and Auditorium: Estimate of Cost

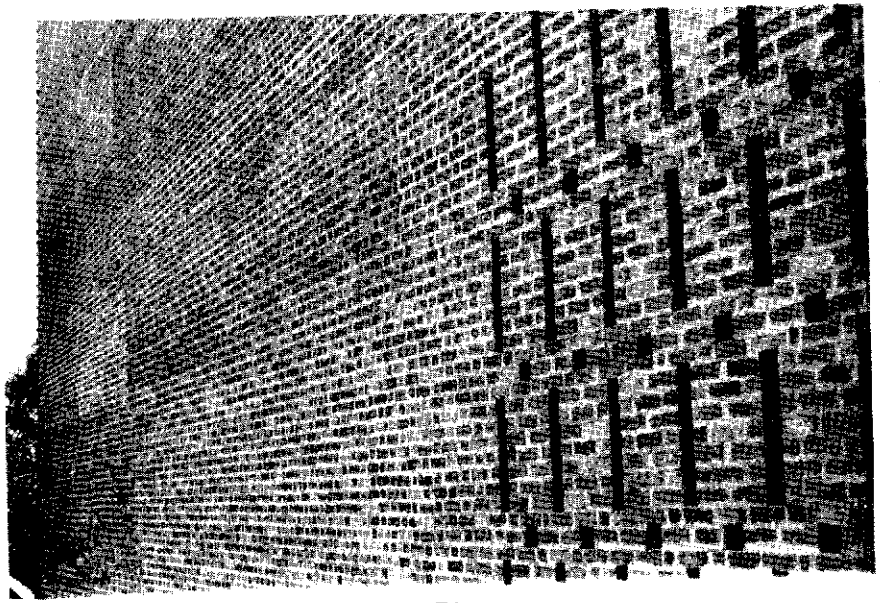
		Rate	*Quantity*	*Figure*	*Say*
Excavation and refilling	cu.ft.	0.06	16,000	960	1,000
Concrete foundations 1:4:8	cu.ft.	1.20	1,900	2,280	2,500
DPC:CM 1:3 crude oil 5% wt c.	sq.ft.	0.30	560	168	200
RR masonry in 1:5 cm	cu.ft.	0.95	3,360	3,192	3,300
first class bricks in 1:5 cm	cu.ft.	1.80	16,100	28,980	29,000
4.5" brick in 1:4 cm	sq.ft.	0.75	1,250	938	1,000
ditto query extra	sq.ft.	0.75	1,600	1,200	1,500
flooring 4"1:4:8 plus c.finish	sq.ft.	0.65	6,840	4,480	4,500
slab floor c. finish					500
0.5" cm plaster	sq.ft.	0.22	11,860	2,609	3,000
3 coat whitewashing	sq.ft.	0.03	11,860	355	500
Supercem 3 coats (2 and primer)	sq.ft.	0.30	11,860	3,560	4,000
RC frame	cu.ft.	11.00		8,500	8,500
RC slabs	cu.ft.	8.00	2,560	20,480	20,500
Doors					5,000
Windows					500
Chapel ceiling					10,000
Auditorium ceiling					7,500
Roof weathering 3" jelly tiles etc.	sq.ft.	1.50	1,150	1,725	2,000
AC roofing	sq.ft.	1.50	6,050	9,075	9,000
Steel trusses	cu.wt.	115.			25,000
Sanitation and drains					2,500
Electrical installation					10,000
3% contingencies				4,425	4,500
Furniture for chapel					18,000
Total					Rs 1,70,000

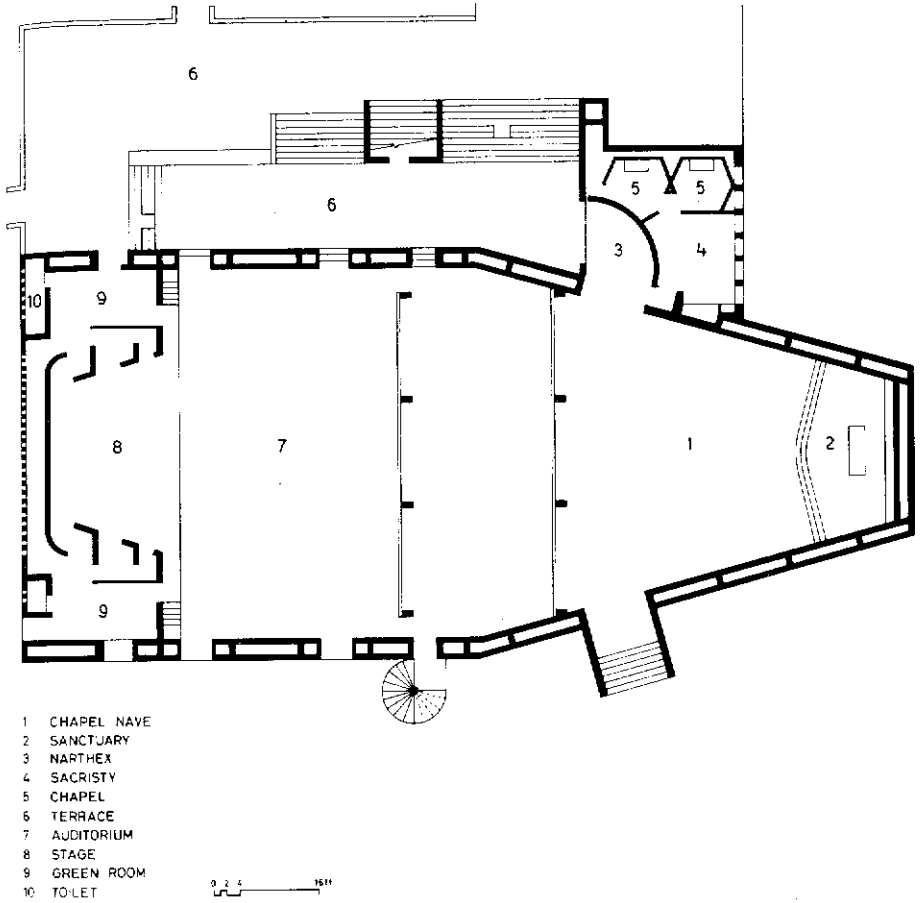
L.W. Baker, A.R.I.B.A., October 1969

that Baker's skills of cost-reduction met their greatest challenge, as it required a seating capacity of one thousand. In an attempt to construct both the auditorium and the chapel within the budget for only one building Baker realized that the cost of placing one large hall above the other would be far too expensive. 'I proposed instead to put them side by side, and decided that the biggest cost-reducing factor would be to avoid the use of steel and reinforced concrete, and to use load-bearing walls with a timber roof frame carrying an asbestos sheet roof.'



In order to increase the lateral strength of the high brick wall, without the introduction of any steel or concrete, Baker devised a wide cavity double-wall with cross-bracing brick. Both the walls were pierced with a continuous floor-to-roof pattern of *jalis*, so that the chapel was adequately, though somewhat mysteriously, lit and ventilated. Despite its tall proportions, the acoustics of the hall were remarkable—the exposed surfaces and the open patterns of brickwork controlling the





reverberations.

One of things Baker deplores about contemporary brick building practices is the cubist approach that avoids any sort of capping or overhangs to wall tops which leads to the walls getting badly stained and streaked in a very short time. So he insisted on a protruding top chord of the wooden trusses. This carries a two-foot overhang of the asbestos sheeting roof and protects the ends of the wooden members by adding a strip of fascia.

One of the conditions specified was that the chapel must not dwarf the existing three-storeyed buildings surrounding it. And yet, the fact

that the chapel had to be high did not make it essential for the remaining structure to maintain the same height. So from a height of nearly 6.5 metres over the sanctuary, the roof descends steadily to the rear of the nave, where it is still high enough to roof the gallery of the auditorium; and then continues down to the stage, and at the far rear to the green room and lavatories.

The total covered area of the chapel and auditorium and the gallery is approximately 930 square metres. The cost in 1970–71, including the furniture and appurtenances, lighting and sanitation was kept within the original gift sum of 1.75 lakh rupees.

Baker says, 'The official clients are Jesuit priests. Although they agreed to my proposals and plans, obviously they did not appreciate the high vast stretches of unplastered brickwork. They had every intention of tarting the whole thing up later on with nice bright paints and plasters, but have not been able to bring themselves to do this simply because there is a small but steady and persistent stream of foreign visitors, both architects and priests, who come just to see and take photographs.'

Loyola Graduate Women's Hostel

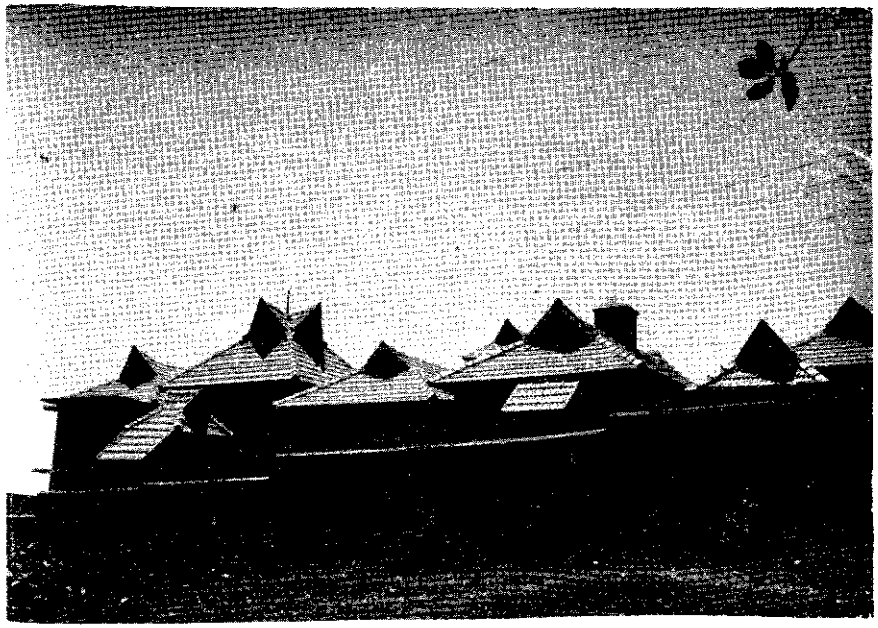
Sreekarayam, Trivandrum, 1970

This was Baker's first institutional project in Trivandrum, and it incorporates in it all the characteristics of his architecture. Open brick walls, corbelled brackets and traditional fish-tile roofs combine in a series of linked arcaded courts set along a slope.

An important requirement had been a quiet seclusion within which the women could follow a strict Christian regimen. 'They were to be guarded from any outside intrusion by devoted and determined nuns,' says Baker. 'Gates were to close at sunset; no windows to overlook the street. Study games, recreation, meditation and exercises were all to be done within high protective walls.'

For Baker it was necessary that the 'prison-like feeling' that accompanies such introversion, be counteracted by the creation of an 'outdoors' within the indoors. So, the sense of being held captive needed to be dispersed in a series of places built within the confining outer walls.

terracotta roofscape

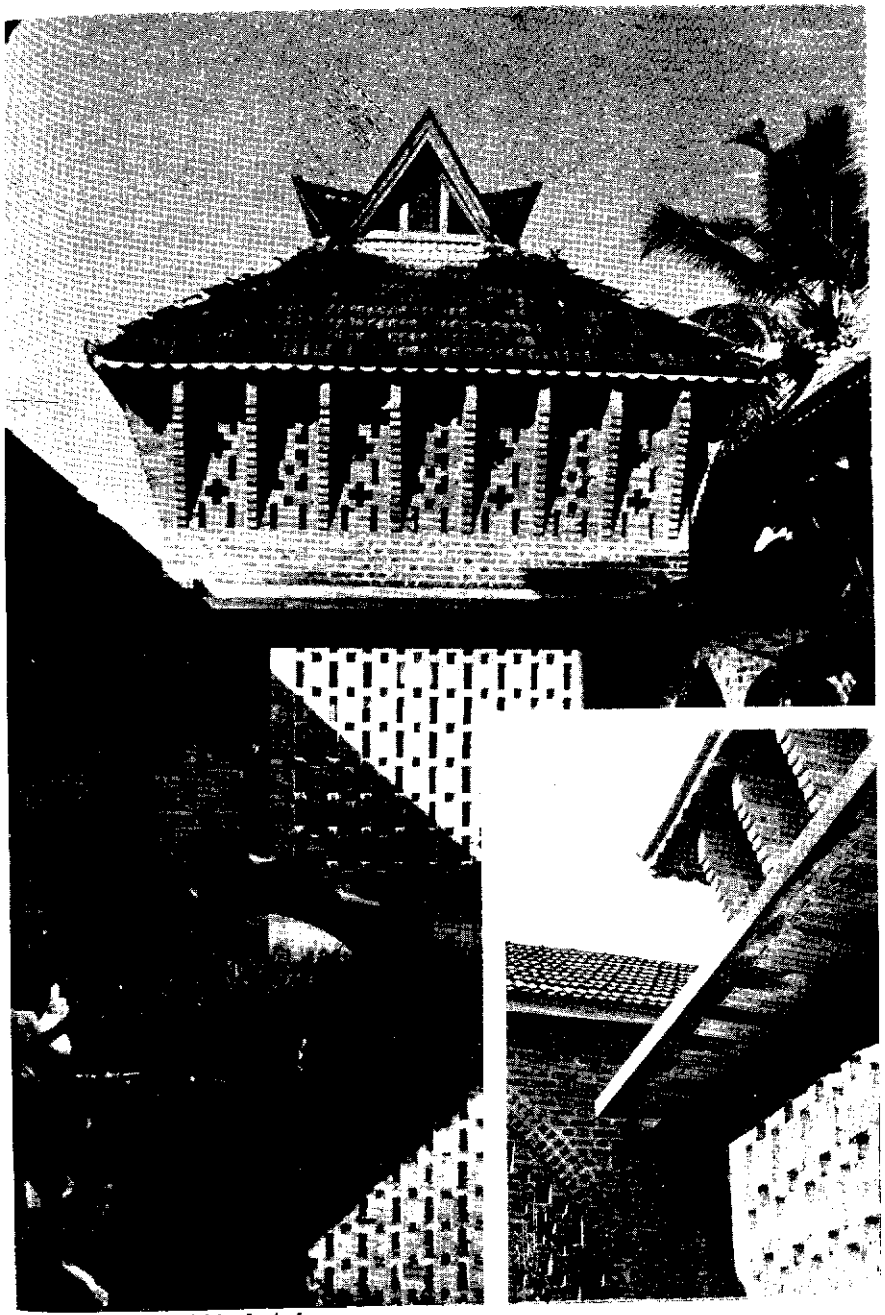


entran

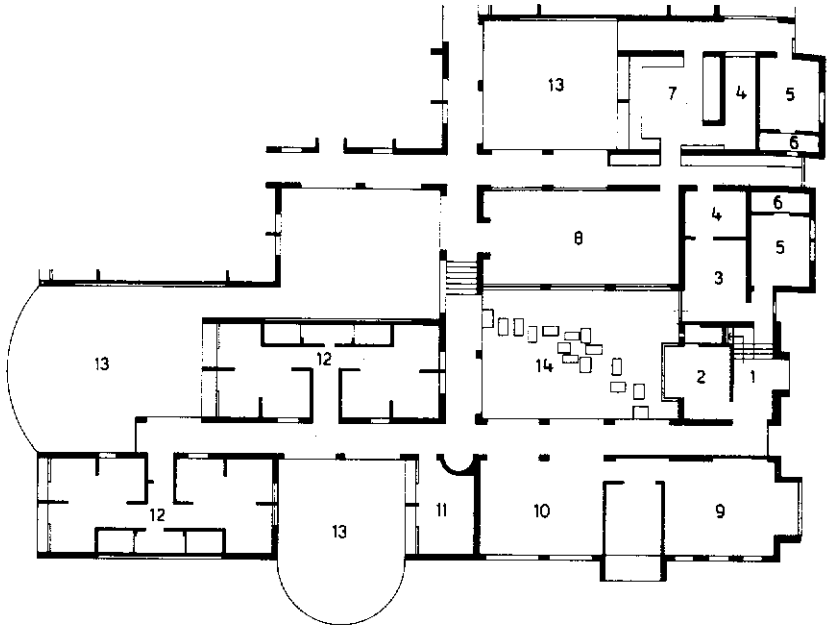
This was dealt with using a 'checker-board plan, in which the black squares became the hostel buildings and the white ones, the gardens, pools, courts and sit-arounds under trees'. Baker sought to provide the intimate scale of a shared house within the conventional hostel plan.

Baker says, 'The girls didn't want single rooms, and I had already discovered while doing other hostels, that they preferred the safety and comfort of a cottage. So I devised a plan with six nooks within a large shared room—each nook big enough for a bed, a desk, a cupboard, a seat or two but with only three walls to each nook and the south wall open into a common central area.

'The final hurdle to get over was that when we presented the checker



an 'outdoors' within the indoors



board plan to the University Grants Commission(UGC) they said "whatever is this? You said you wanted a Hostel! This looks like holiday cottages on the beach. A hostel is a row of rooms along a corridor with the usual services and stairs at one end or the other..."

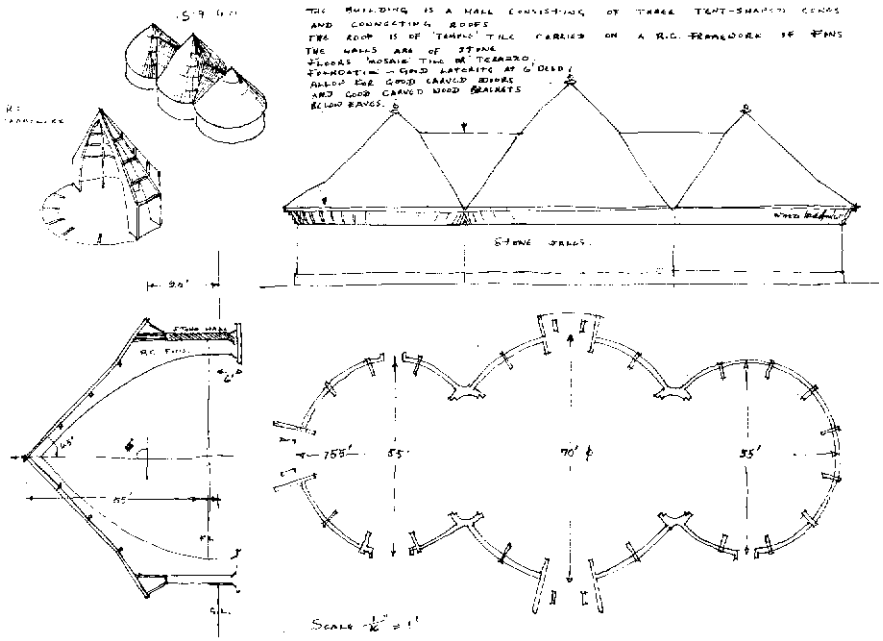
'It took a long time to persuade them that this was not only a more suitable hostel but a much cheaper one. "Nonsense"—they retorted again—"the University Engineer had better do your estimates for you."' His estimates were double mine and yet we had fulfilled the UGC requirements. And so, we built the hostel for our original estimate—and never had the final phase payment because we had added so many odd desirable extra rooms that were not down on the UGC list of what a Graduate Women's Hostel should have.'

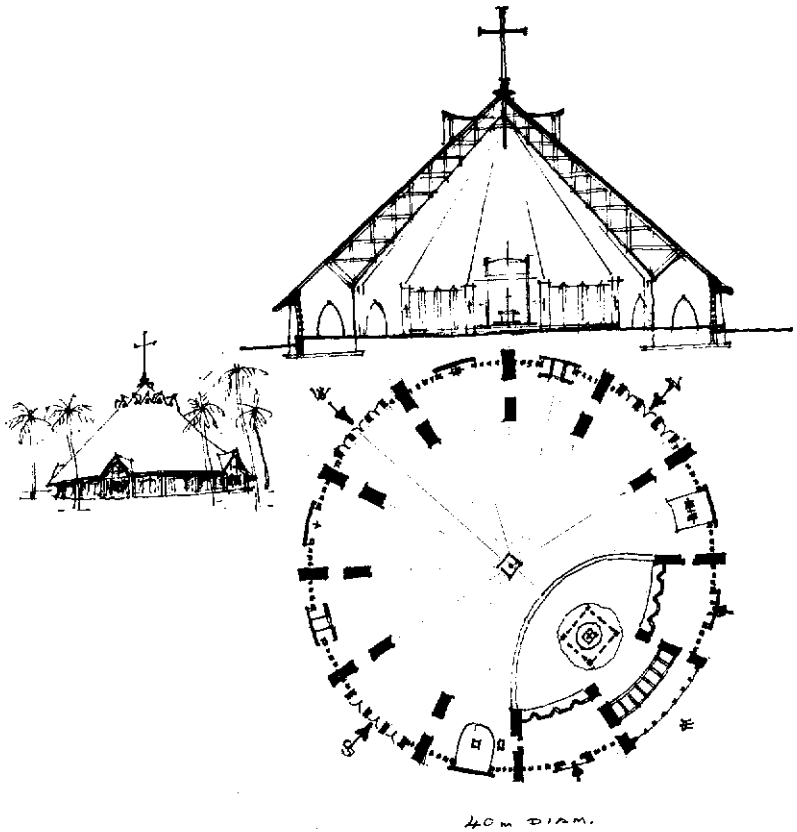
St. John's Cathedral

Tiruvella, 1973–74

Christianity came to Kerala nearly 200 years ago. It is not known what sort of architecture was used in the early church buildings, but most likely local wood, bamboo, thatch, and soft laterite stone were used for their building. Presumably an impermanent local style of architecture developed out of these materials and it probably resembled the traditional bamboo constructions used by the Hindus in their religious buildings. But in Kerala's hot and humid, tropical climate, timber and bamboo deteriorate quickly and buildings would have been constantly in a state of repair or renewal. Many centuries later, the Portuguese, the Dutch and other European colonizers brought with them—what they believed to be—a proper Church architecture. The fact that this imported style is the only religious Christian architecture that remains in Kerala today almost certainly means that they disapproved of whatever indigenous church architecture they found here.

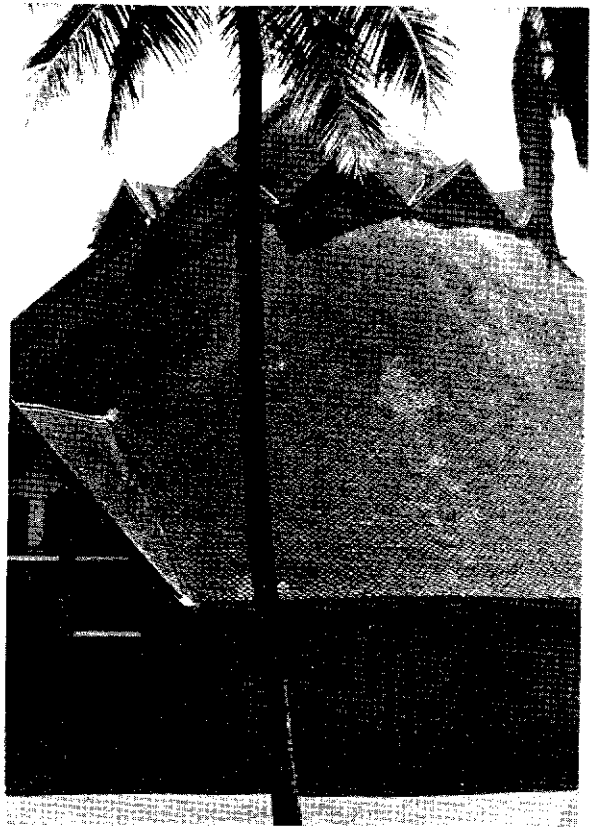
However, after attending the Second Vatican Council in Rome, the

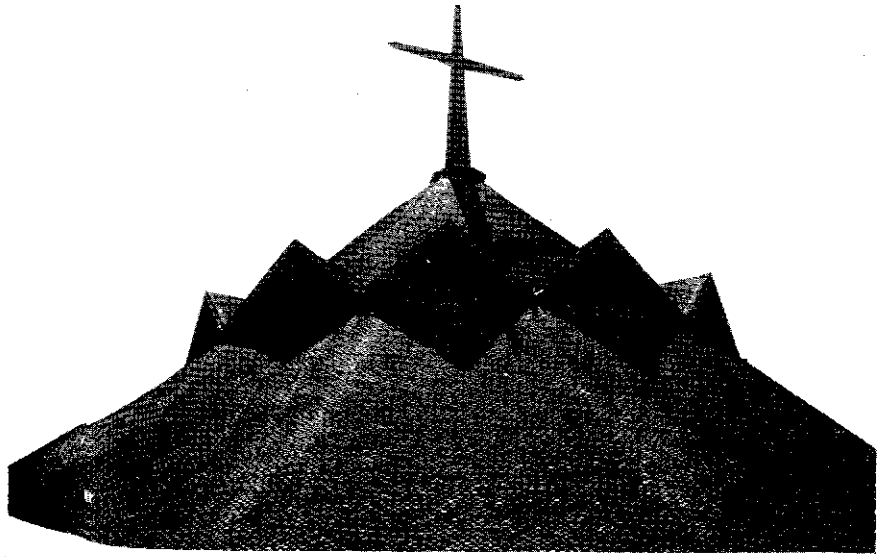




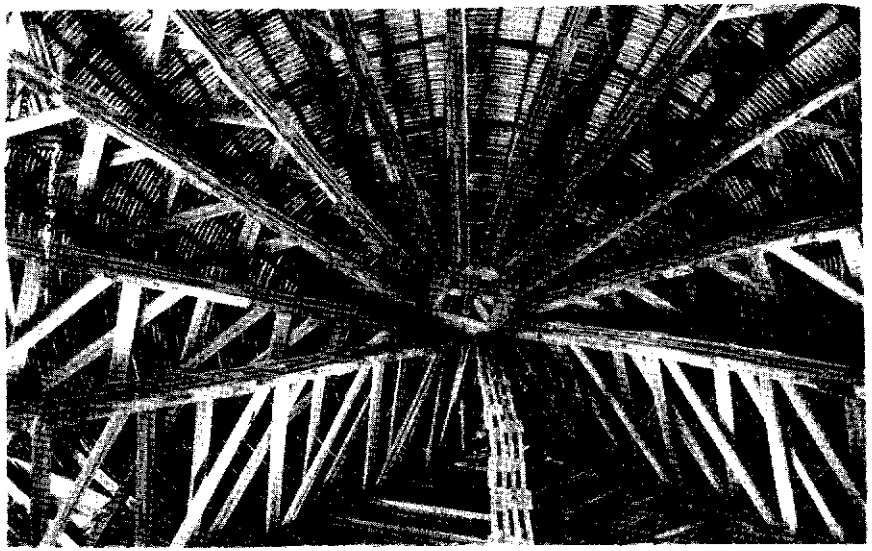
Bishop of Tiruvella, Mar Athenasios, returned to Kerala inspired by Pope John's pronouncements that each country should build its churches in its own indigenous style. But the problem was that nothing remained of Kerala's indigenous Christian architectural style. Every church, however old, was in the western Baroque or Gothic design. There was not a hint of anything indigenous. The people themselves would point to the western-styled churches and say 'this is our Kerala style'.

Laurie Baker sought the probable historical developments after the apostle Thomas came to Kerala in the first century. He pointed out that the local Hindu temple architecture is not a 'Hindu' or a 'Kerala' one but a functional bamboo style and has its counterparts in other tropic

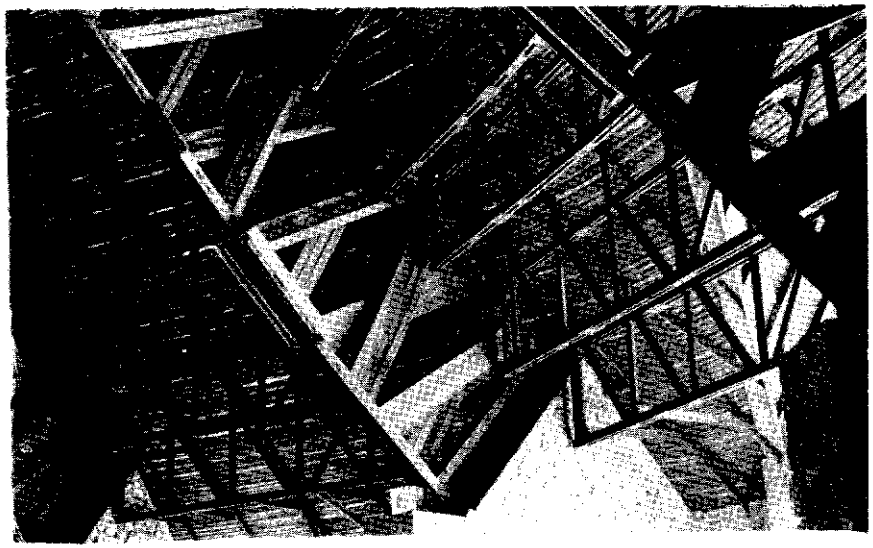


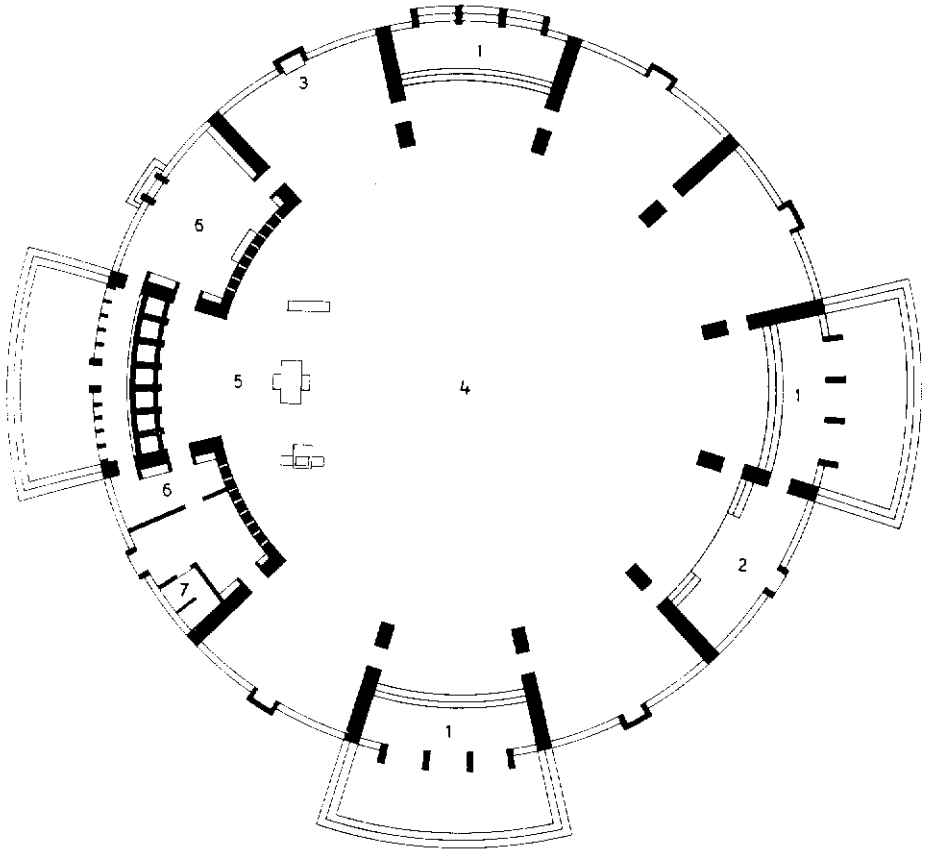


details of roof trusses



bamboo-growing countries. He demonstrated, with sketches, how the bamboo architectural style could be modified for the Christian requirements. After a great deal of research and experimental sketches, the Bishop agreed that the effort could be adapted to the construction of St. John's





1 PORCH
2 BAPTISTRY
3 CHAPEL
4 THE NAVE
5 SANCTUARY
6 SACRISTY
7 TOILET

Cathedral.

Interestingly enough, the people accepted this idea more readily than most of the clergy who resisted it, mainly because of the building's close resemblance to some of the big local Hindu temples. But Baker's cathedral only reinforces the idea of recreating the centrally-planned church in a vernacular idiom. In a circular plan of approximately 120-feet diameter, the building combines the internal organization of a Greek-cross with the external appearance of a Hindu temple. However,

the roof of terracotta fish-tile

unlike the temple, the drum and the steeply pitched roof of the circle are not contained within a confining ambulatory or court, but are set squarely in the centre of a walled compound.

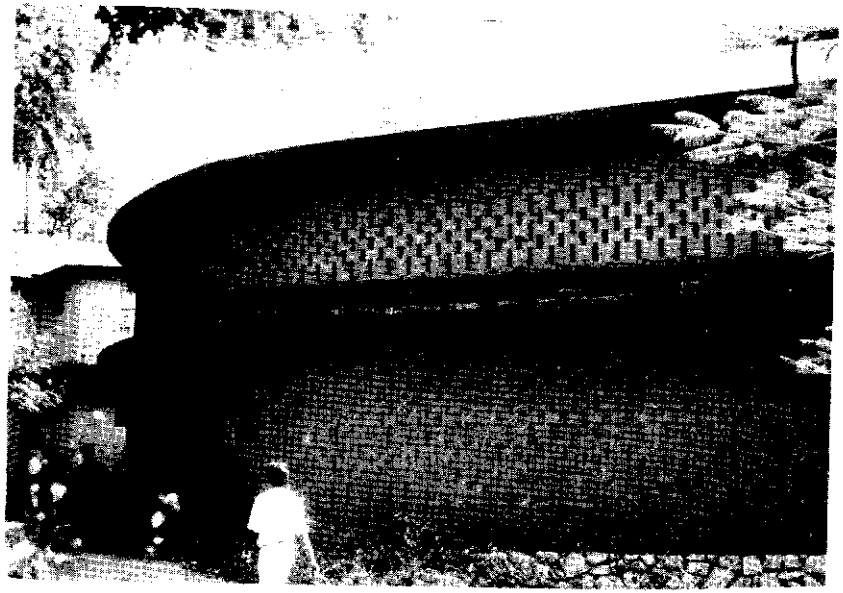
The outer walls are built entirely of locally-available granite and brick. Jackwood is used in the trusses that span the walls and rise to a central skylight. Because of their seventy-foot length and the difficulty of erection, working details for the truss laminations and joints were done with the help of engineers at the Forest Research Institute. The roof, pitched steeply, is covered with the traditional terracotta fish-tile.

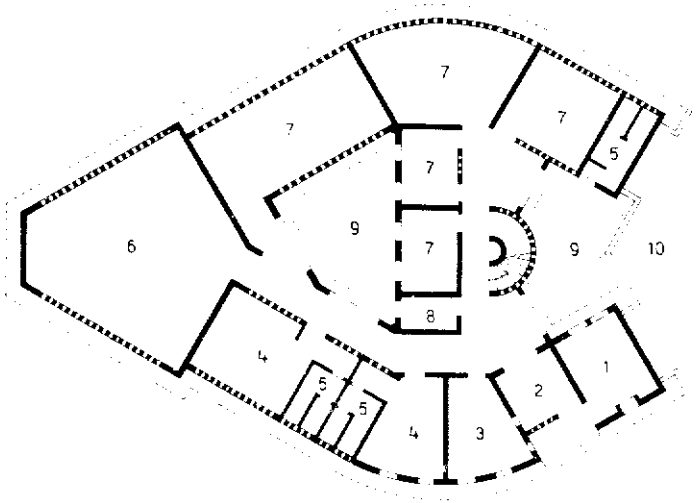
Nalanda State Institute of Languages

Nandankode, Trivandrum, 1973

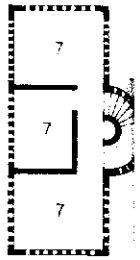
Laurie Baker was asked to produce a design for this institute, which temporarily functioned out of a tiny house consisting of the main room and verandas accommodating the printing machinery. The translators were housed in bathrooms. Baker says, 'The Director had approached me in desperation asking if I could do a simple building within a month for his printing presses while they could continue to use the house as the office.'

Baker's project, when completed, demonstrated both the practicality of construction within the prescribed budget, as well as the ability of meeting the one-month deadline. This was achieved in the reductive simplicity of the buildings which form the complex. The architecture has a barn-like austerity; the repetitive profiles of the roof, the rhythm of the windows and the continual texture of unrelieved walls suggest an industrial assembly-line. Exposed brick is used throughout in staggered bonds of half-brick thick walls. The recesses and rough textures, the architect felt, made little difference in a place accommodating





GROUND FLOOR PLAN



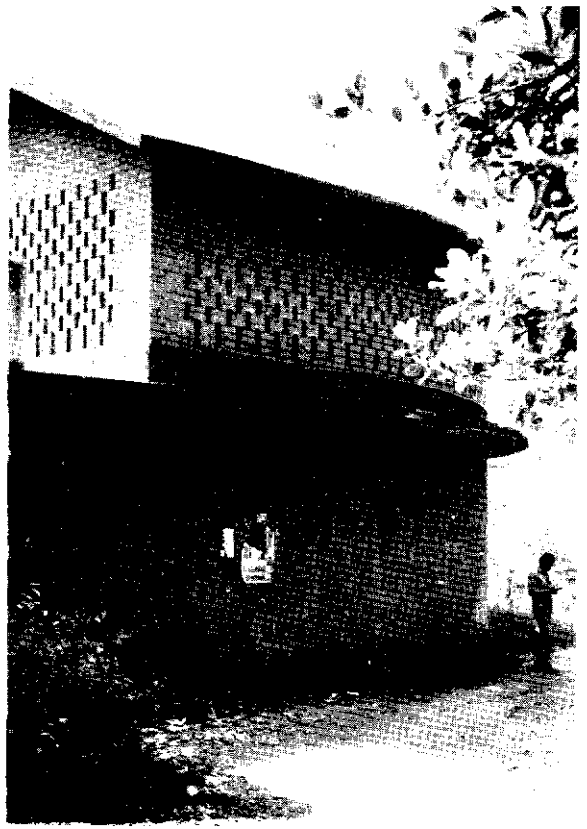
FIRST FLOOR P

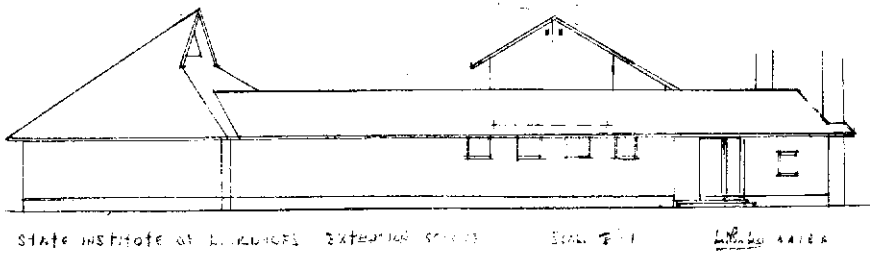
1 BOOK SHOP
2 FOYER
3 OFFICE
4 STAFF
5 TOILET
6 HALL
7 ROOM
8 STORE
9 OPEN GARDEN
10 EXISTING BUILDING

Nalanda State Institute of Languages: Estimate of Cost

	Quantity and Rate	*Appx. Cost*
Basement	2,900 cu.ft. RR @ (130) 90	2,610
Exc.	1,400 @ 80(90)	112
Brickwork	5,000 cu.ft. @ 160(200)	9,000
Flooring	4,100 sq.ft. @ 80 (90)	3,280
Special roof	1,600 sq.ft. @ 2	3,200
Mang. tile roof	5,500 sq.ft. @ 140 (160)	7,700
Plaster	2,000 sq.ft. @ 20	400
Doors and windows		12,600
Total	Rs	38,902

mechanized production. The high walls, toned with a colour wash, support combinations of wooden truss and tile roofs as well as Baker's filler slab. Their spatial organization too, very simply reflects the printing process in a single file plan and is set on the relatively flat site surrounding the old house.





Chitralekha Film Studio

Aakulam, Trivandrum, 1974–76

A film studio is an unlikely commission for an architect who has devoted a lifetime to low-cost shelter. But the building was built at the request of Adoor Gopalakrishnan, a friend, and one of the country's more sensitive film-makers.

The complex is sited on a promontory on one of Baker's more dramatic locations. Overlooking vast stretches of paddy fields, the distant ocean and a neighbouring hill, the building is dispersed into fragments that take advantage of this spectacular view. Unlike a conventional studio where the focus is strictly contained within a building envelope so as to control the fiction of filming, Baker split the complex into its residual parts: filming, editing, scripting, library, administration—and then made the necessary connections across verandas and courts.

For the visitor, there is an air of the stage set even in the buildings. The approach from the road is along a high wall with the usual Baker bonding, which terminates at the gate into a traditional turret and a watchman's cabin. From here, the road curves gently uphill and reveals the two predominant architectural features of the complex: a wide

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two-storey tower with a conference room above and a low entrance portico, a wooden remnant from a temple which has been incorporated into the front wall.

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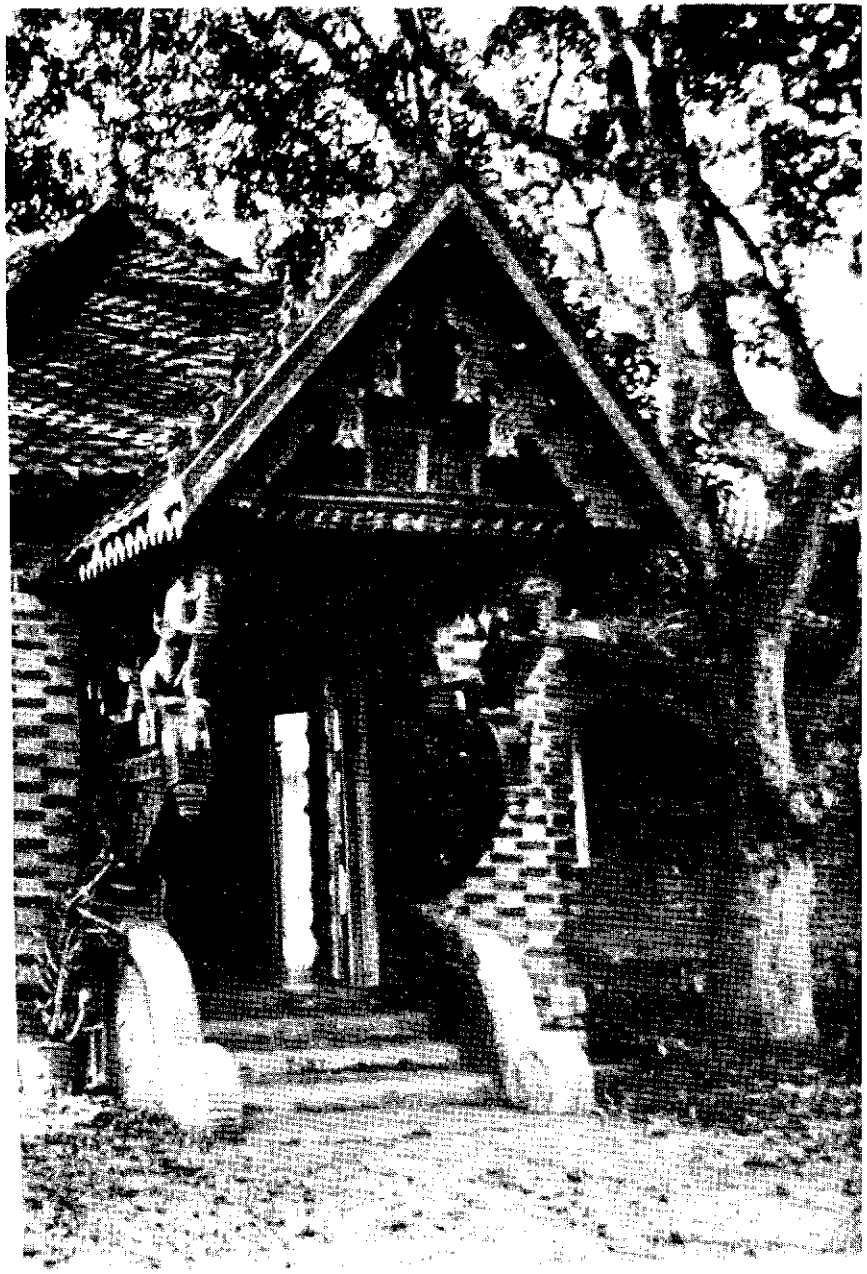
temple portico as studio entrance



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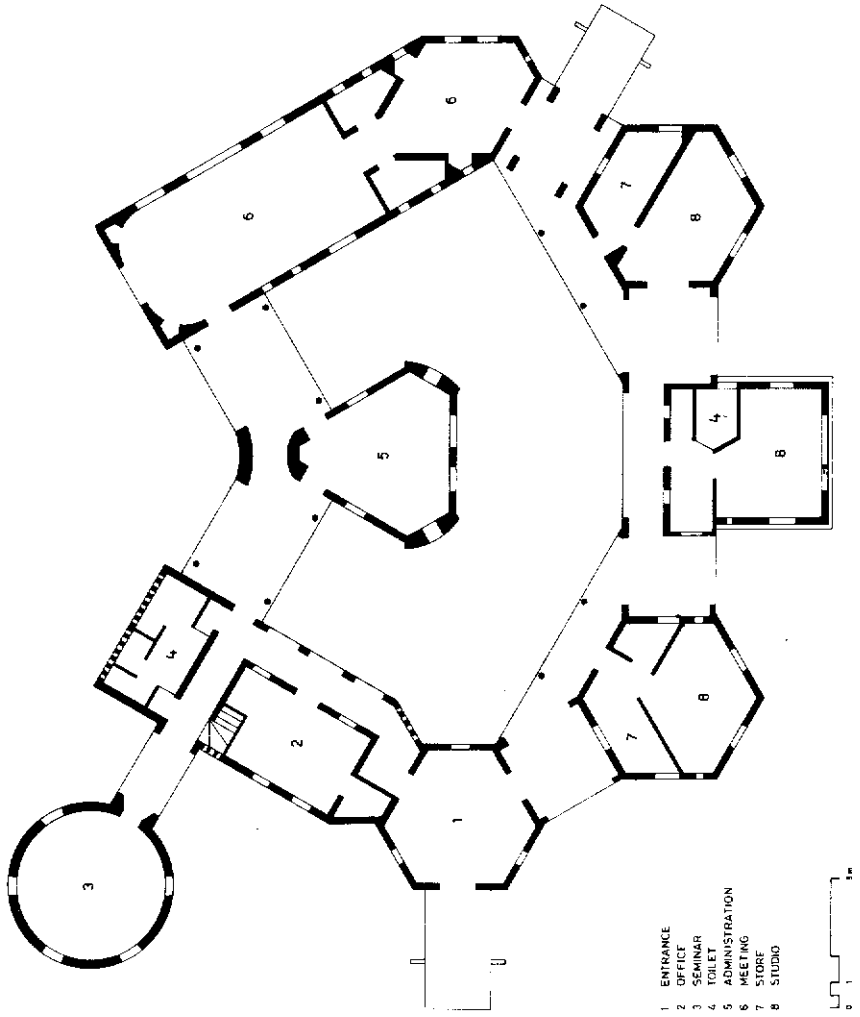

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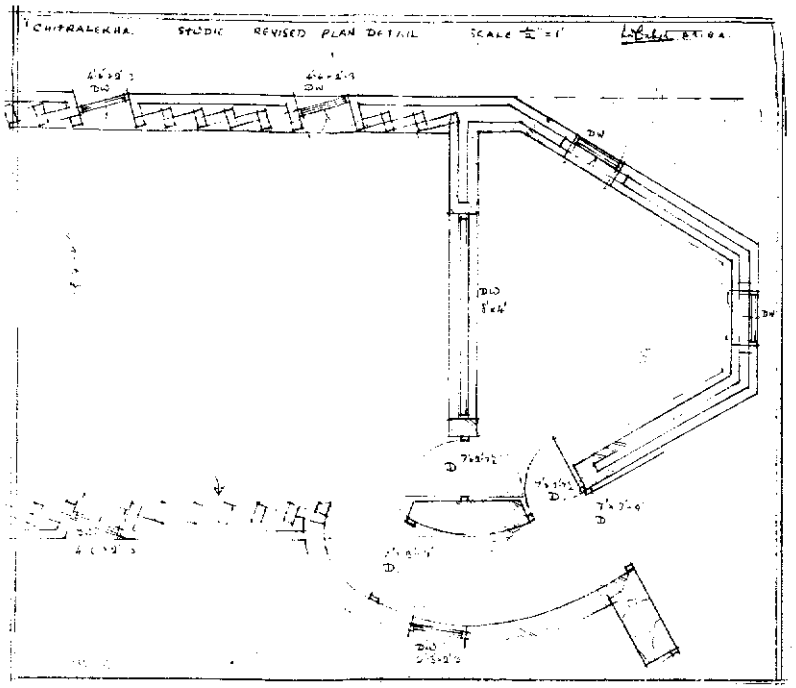


The split plan, dominating the landscape with its controlling geometry, is yet another departure from Baker's normal style. Where the site topography provides no clue to the anchoring of buildings, the architect has had to turn to geometry for its organization. This is assiduously accomplished by the numerous hexagons connected by the arched veranda, and oriented towards different slopes of the same hill. The buildings are built entirely of brick bonded in alternating bands of plastered and exposed brickwork. The roofs, sloped and self-contained over each room, are of fish-tiles. An intriguing composition of concrete medallions is incorporated in the wall of the entrance court.

Corpus Christi School

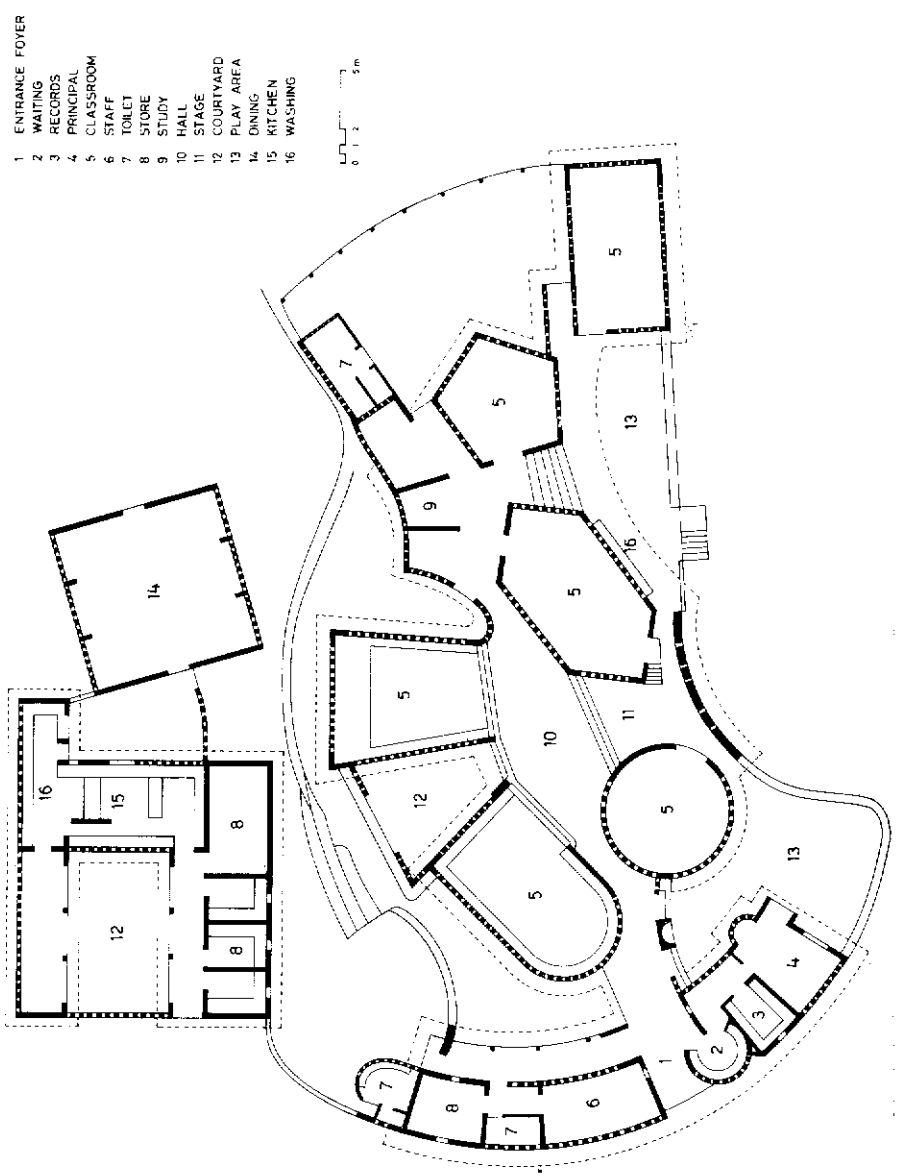
Kottayam, 1972

If a house can suggest the idiosyncracies of its resident then an institutional project should also reflect the attributes of the institution in its architecture. At the Centre for Development Studies (p.160) Baker's expression was consistent with the cost-effective economics and policies of development. Here, at the Corpus Cristi School, the nature of a child's experience in learning and play is reflected in a plan that itself suggests a playful inquiry.

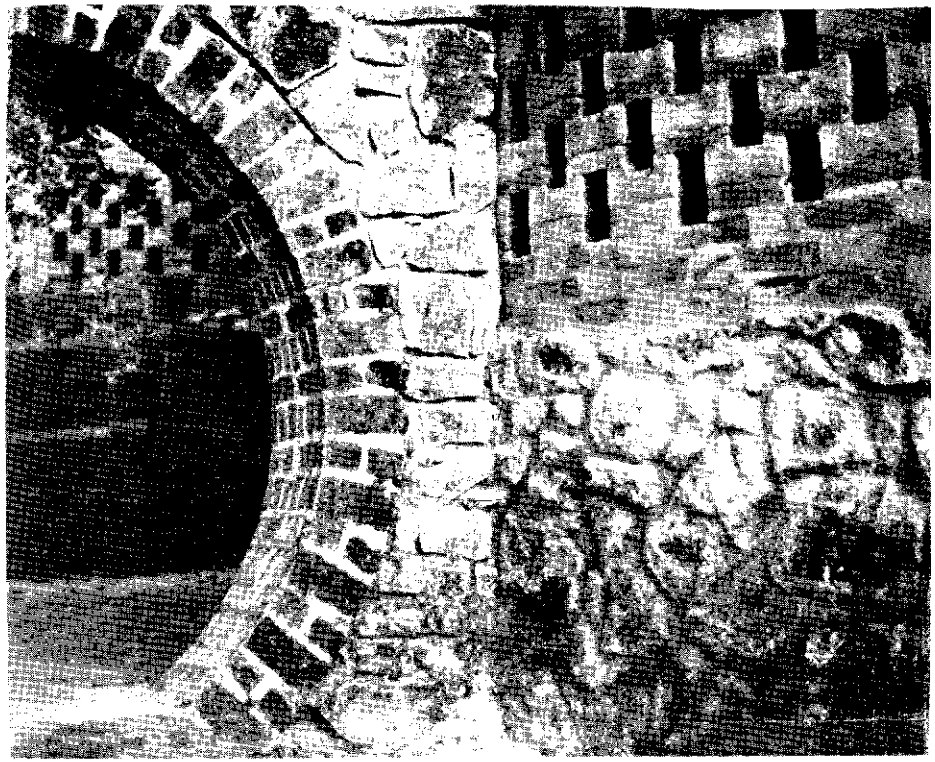
The straight line and excessive rectilinearity may not directly offend a child's sensibility but Baker feels the meandering wall, the circle and square as counterpoint, make for a more desirable and inhabitable landscape. Where rooms do not have the formal labels of classroom, assembly hall or office, the student feels less intimidated and is left free to roam, to meet others like himself, and discover places suitable for learning and play.

The site along a gentle hill is graded into a series of related plateaus. The upper contours, serviceable from the road, contain the formal

entrance and the administrative block



functions of kitchen and services in a rectangular courtyard building, the dining hall breaking free from the composition. On lower ground, the rooms twist, turn and triangulate into varying positions and sizes,



offering choices of formal classrooms as well as intimate study dens, larger halls and smaller nooks. The playfulness of the walls, however, reveal a delicately worked flexibility. Rooms function as independent classrooms, but, when necessary, their radiating walls also serve to shift the focus to the gallery outside, and, together, the teaching complex becomes a single multipurpose hall.

The success of the project is doubtlessly the outcome of an architecture that itself encourages innovative teaching; this is also apparent in the rapid expansion programme and the increasing enrolment of students in the school.

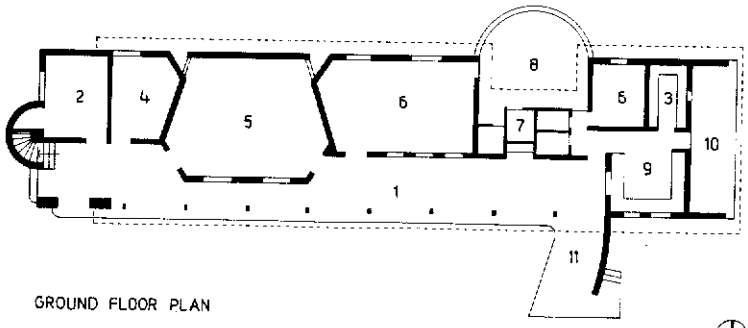
Children's Village

near Nagercoil, Tamilnadu, 1965

This small institution for orphans was set up at the personal request of a philanthropic German. The institution now forms part of a countrywide chain of similar institutions supported by the Christian Mission Service.

Ten to twelve boys and girls between the ages of three and sixteen live in a single house. Each house is designed as a self-contained unit, comprising of a room for the house mother, dormitories for the children and a bathroom and kitchen block—all organized around fronting verandas and a courtyard. The several similar houses on the site vary subtly to accommodate the topography. Though numerous additions and sub-divisions have been made since the original construction, the buildings still retain the character of a courtyard dormitory, in which the children live as a large family.

The complex has all the components of an institution, and yet the architecture has none of the forbidding heirarchy and enclosure of one. Baker has deliberately chosen a building image compatible with a large house, low and dispersed on the gently sloping contours, to provide a docile setting for the children traumatized by parental loss. For the children, the 'tucking in' of the buildings—classrooms, dining hall, bath houses—into the forest makes for an organization where nature



GROUND FLOOR PLAN

1 MULTI PURPOSE VERANDAH
2 OFFICE
3 STORE
4 RESIDENT
5 HALL
6 ROOM
7 TOILET
8 COURTYARD
9 KITCHEN
10 WORK AREA
11 OPEN STAGE

dominates the built form. This may be disconcerting to a visitor who could lose his way in the complex, but the permanent residents of staff and the children find the green landscape a congenial backdrop to the buildings.

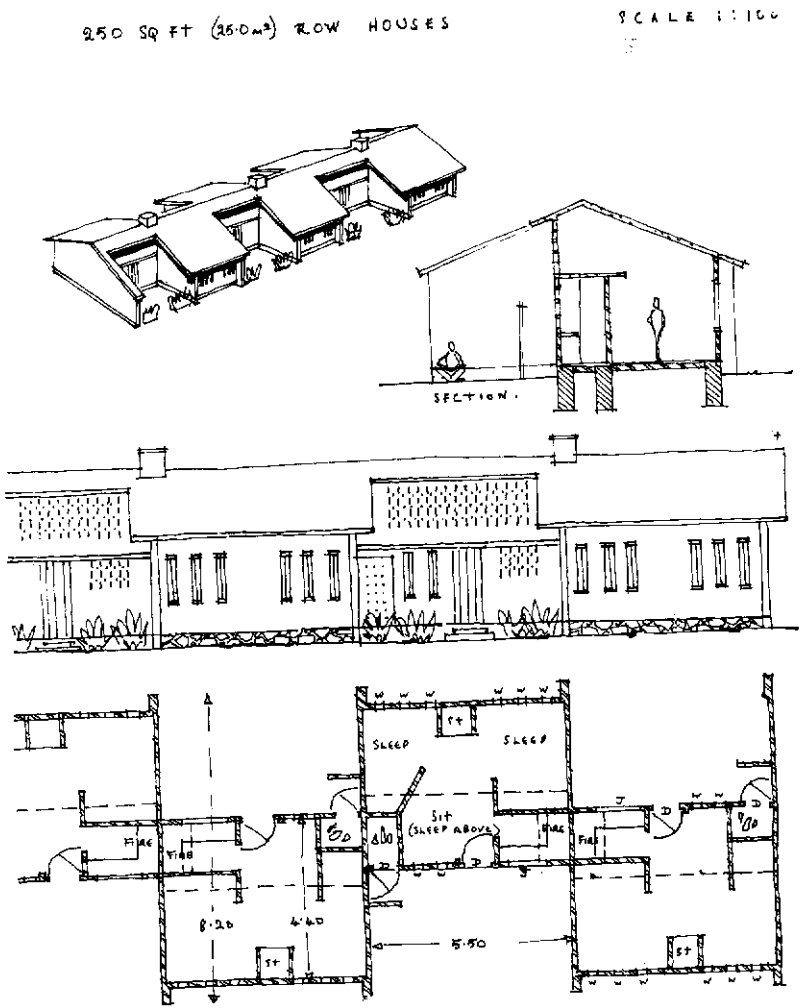
In virtually all of Baker's institutional work, the architecture has an uncertain, almost unfelt, presence, backed by a conviction that buildings—whatever their function—are secondary to the surroundings and sustained only by their natural harmony with environment. This is so even in those institutions where convention ordinarily dictates that the organization be clear and discernable.

Fishermen's Village

Poonthura, Trivandrum, 1974–75

In tribal societies, where the erection of shelter is a labour shared by the community, where the making and reshaping of homes is a consequence

an alternative design



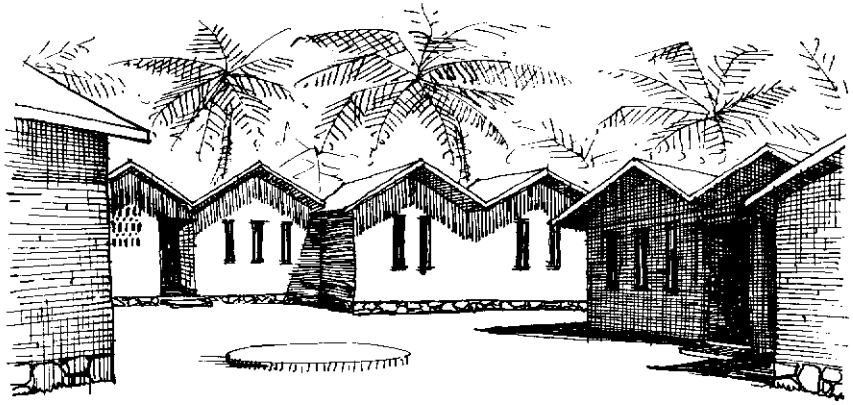
the building

of the strong ties of kinship, the insular family and caste organization—the mediation of an outside architect can hardly be welcome. Moreover, the severity of the environment in which the tribals live and the limitation of their resources, impose restrictions that have kept most of the conventional architects away from such projects.

Paradoxically, these were the reasons that brought Baker into the project for displaced fishermen in Trivandrum. Baker says, 'It was an unusual project. Every year some village or the other in Kerala gets washed away and every year they get an enormous amount as compensation money for clothing and blankets and may be even some for the replacement of huts.'

Baker felt that the amount spent every year on rehabilitation could be more usefully directed into the construction of permanent houses, designed and oriented to counter the effect of cyclones. With the support of the Chief Minister he proceeded to survey, design and build on land newly acquired near the old site. It was during this time that Baker realized the difficulties of dealing with large insular groups, with set ideas and tradition. He recalls, 'I didn't have much time to study the project. They were all so distressed over the storm damage and we had

the final sketch



to get the houses up as quickly as possible; and we mainly wanted to demonstrate that such permanent structures could be put up quickly.'

Though the materials, the exposed brickwork and structure, and the sloped concrete roofs, are similar to Baker's other projects, the unique innovation here is the openness of design and the way individual units offset each other. The cyclonic wind meets no resistance and is allowed to pass through the house by the continuous lattice work in the exposed walls. The low sloped roofs and courts serve as wind-catchers, and the open walls function to dispel it. The long row of conventional housing is replaced by an even staggering, so that fronting courts catch the breeze and also get a view of the sea, and at the same time 'there are little private rectangles of land in between the houses where they can dry the nets and kids can play'. Since a good part of a fisherman's life is spent out of doors, the house and court function admirably—providing sleeping lofts within, and adequate space outside for mending nets and cleaning and drying fish.

Though the project was built and occupied as planned, there remained in it, a certain sense of incompleteness. Besides the houses, there was little else on the site—community structures, shared facilities, or even a confining boundary—that could suggest a heirarchy. But this is perhaps a shortcoming in most experimental work, and the inability of a professional to comprehend the underlying patterns of a tribal group and to respond to its private needs.

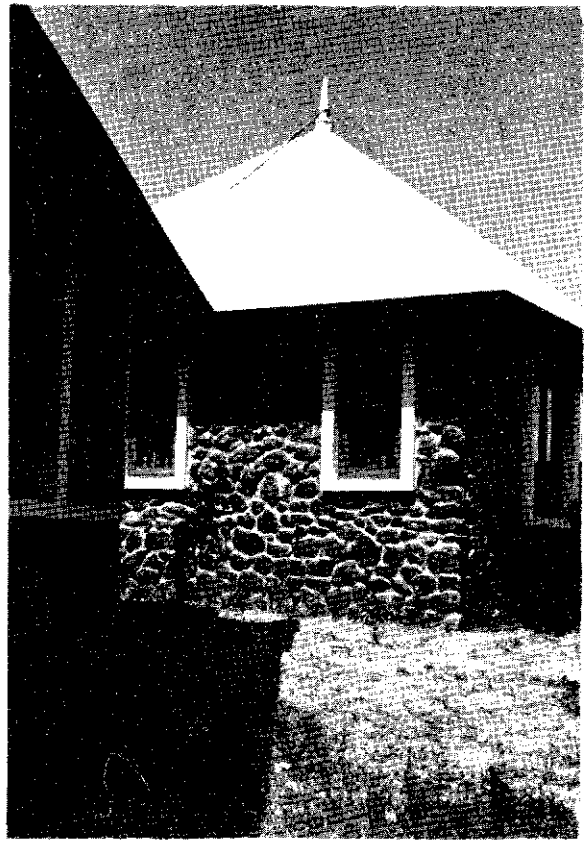
Tourist Centre

Ponmudi, 1980

The former Chief Minister of Kerala, Achuta Menon, proposed the setting up of a health resort for Trivandrum on the 3000-foot high peak at Ponmudi, sixty kilometers from the city. Baker was asked to submit a scheme for the complex to be built by the Public Works Department (PWD) and supervised—to pacify the auditors—by a government chief engineer.

On the dramatic slope, strewn with boulders and devoid of all vegetation, Baker planned a series of isolated cottages stepping up the

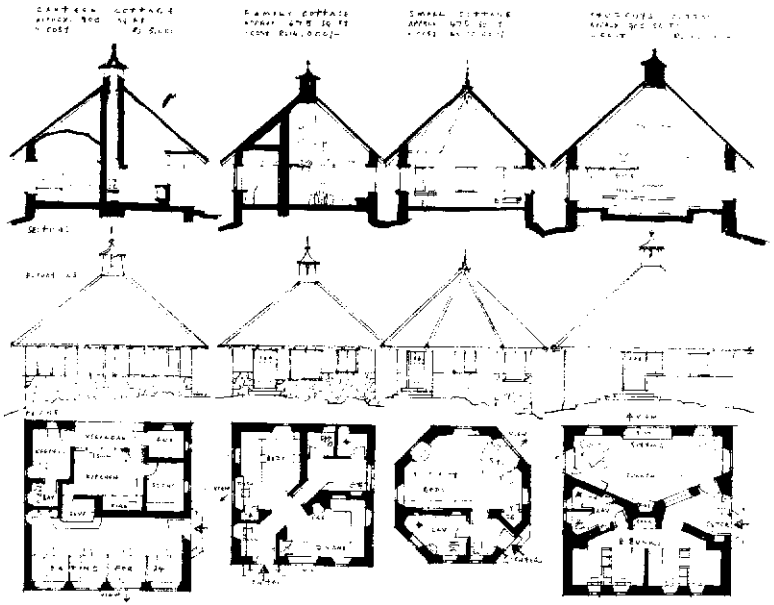
the concrete-pyramid-capped cottage



cottages stepping up the gradient

gradient. 'I thought of them as rocks dropping and anchoring to a cliff, says Baker.

Baker's view of the tourist scheme



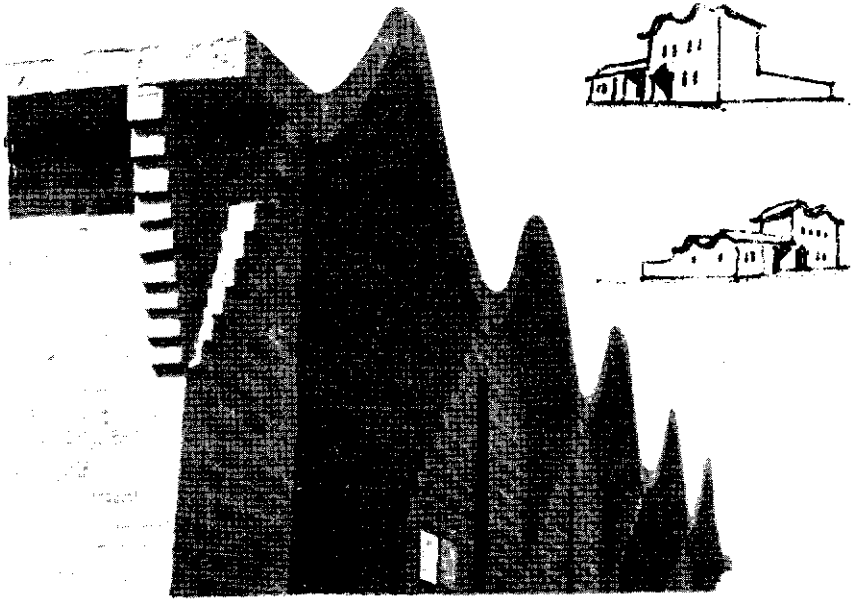
With a uniform stone elevation capped by a concrete pyramid, the architecture of the cottage reinforces the image of rugged materials assembled in clear simple forms. But inside, each rock assumes the home-like comfort of a snug retreat. An exterior face of rough random rubble gives way to designs of varying shapes and dimensions: a square plan accommodates bunks for students, an octagon for a couple, and a smaller square for a family.

Experimental Houses

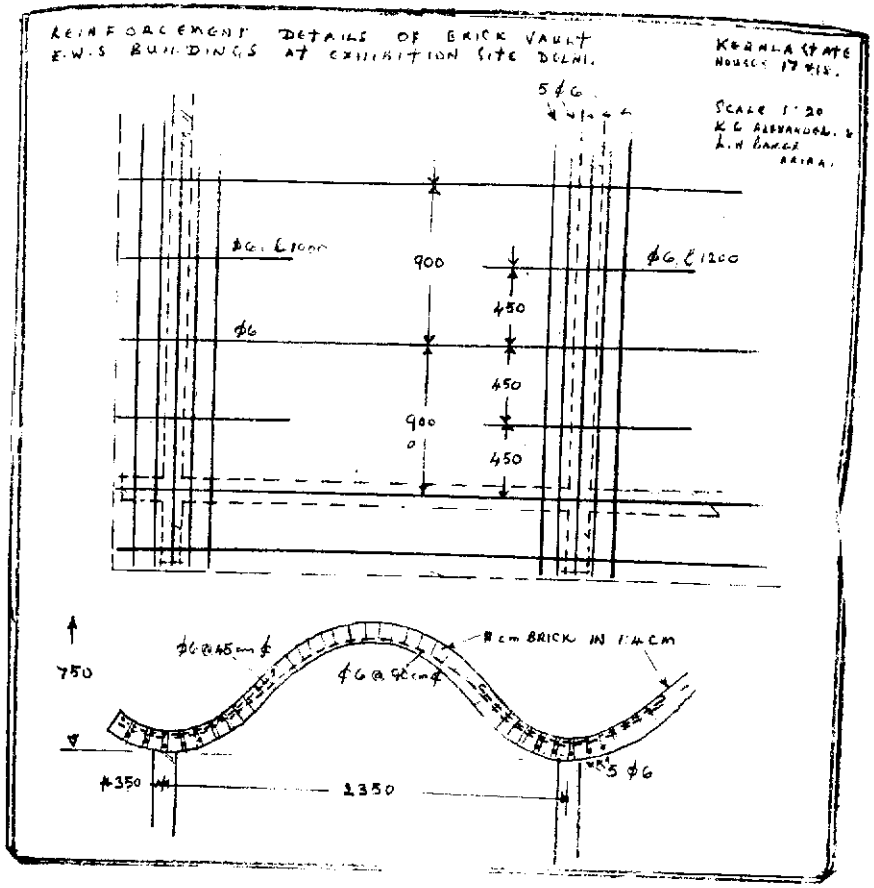
New Delhi, 1980

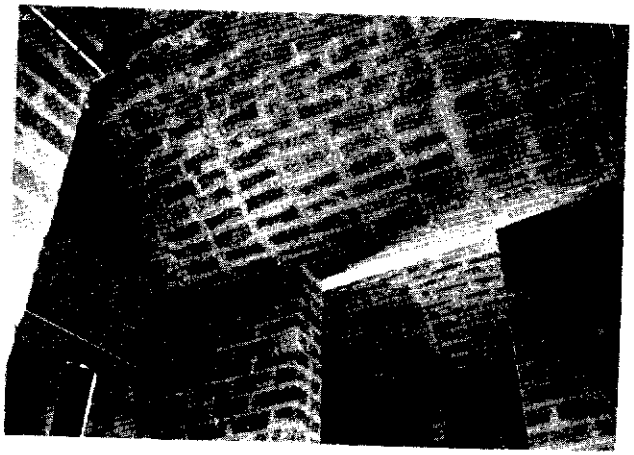
Two houses constructed for the Government of Kerala at an exhibition on housing at New Delhi, brought to the capital some of Baker's practical ideas on low-cost construction. The larger unit has a half-brick thick wall throughout, in small sections, stiffened by curves, to define three rooms and a series of services off a rear court. The second house type achieves a comparable covered area in a more compact design.

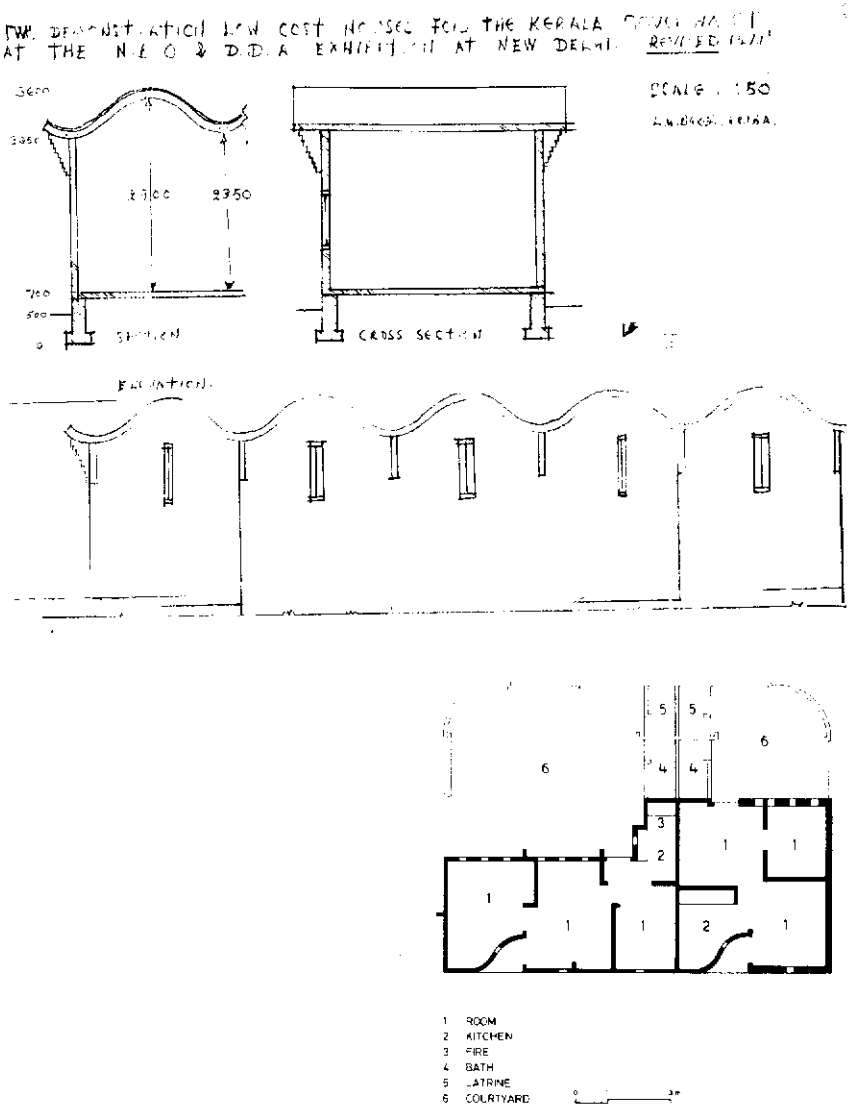
Baker said, 'When I did these Delhi houses I did not know Delhi at all well, nor did I know what inexpensive building materials were to be had there; my brief inspections showed me that mainly brick and concrete were being used. I was trying to find alternatives to concrete, mainly because both cement and steel had very highly intensive energy consumption in their manufacturing process. I decided, therefore, to use brick as much as possible. The parabolic and inverted parabolic vaults used only bricks and mortar and a small quantity of steel. I did not repeat this in the roofing system because of the cost of shuttering—



details of the roof





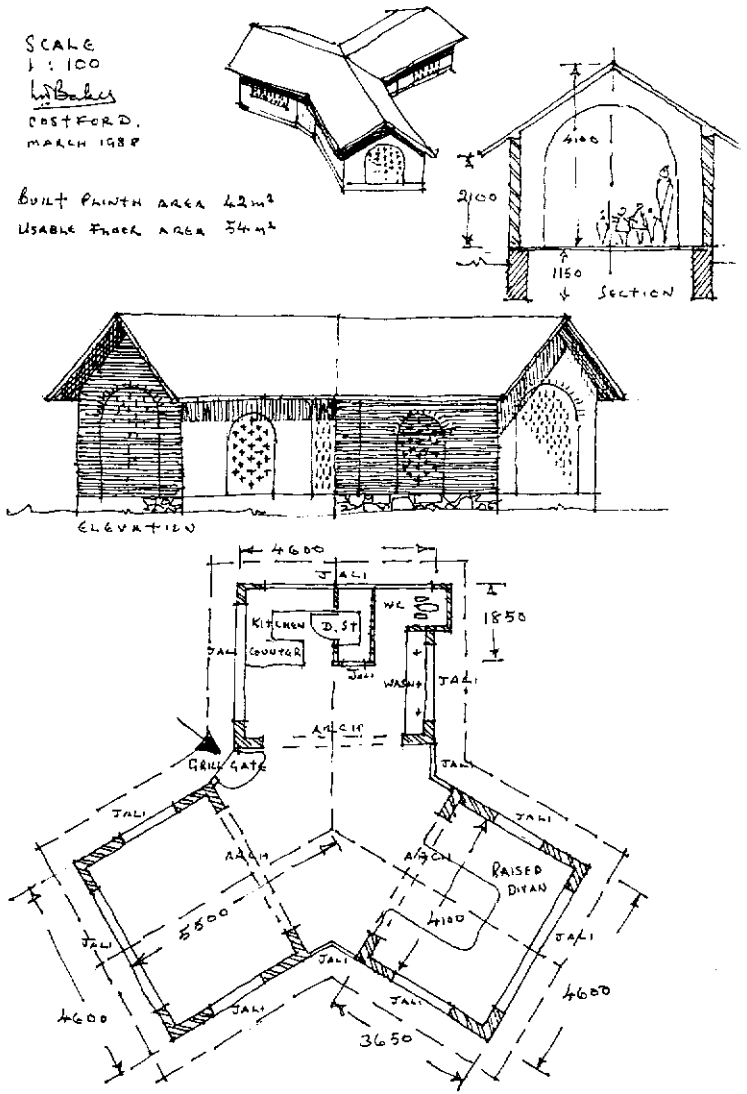


though I am sure for a colony or a large number of standard-sized buildings re-usable form-work could be devised and used.'

Anganwadis

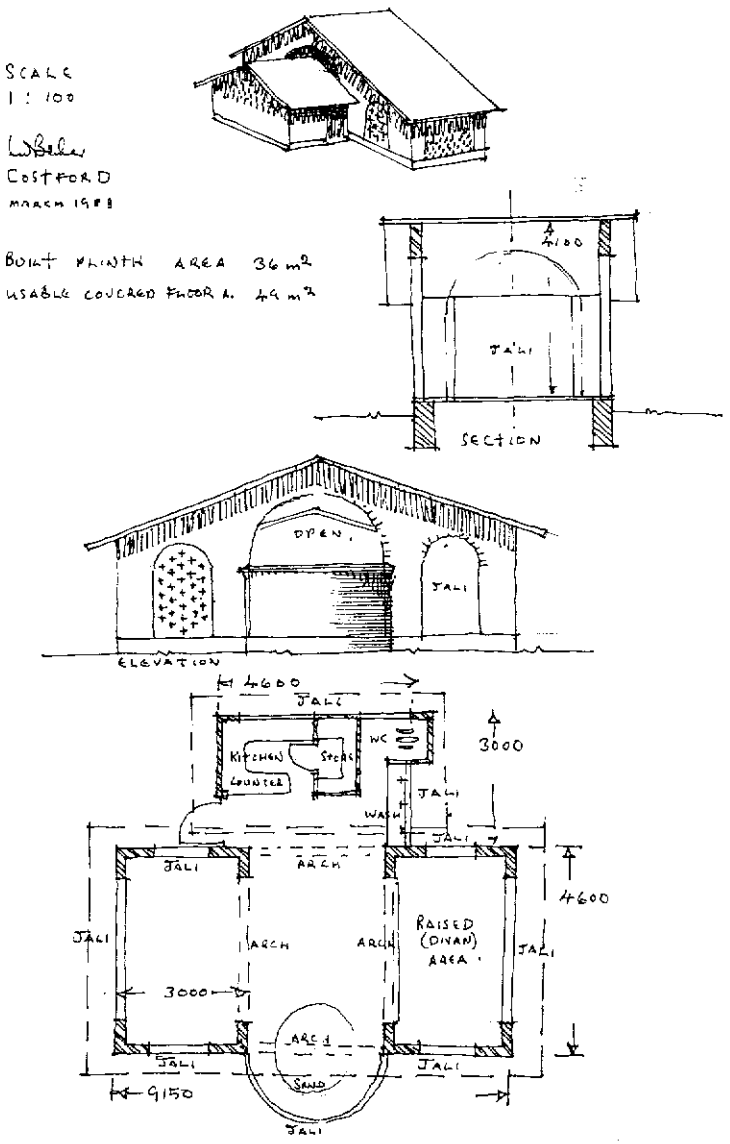
Trivandrum District, 1984

As part of the district program to promote informal education, the state

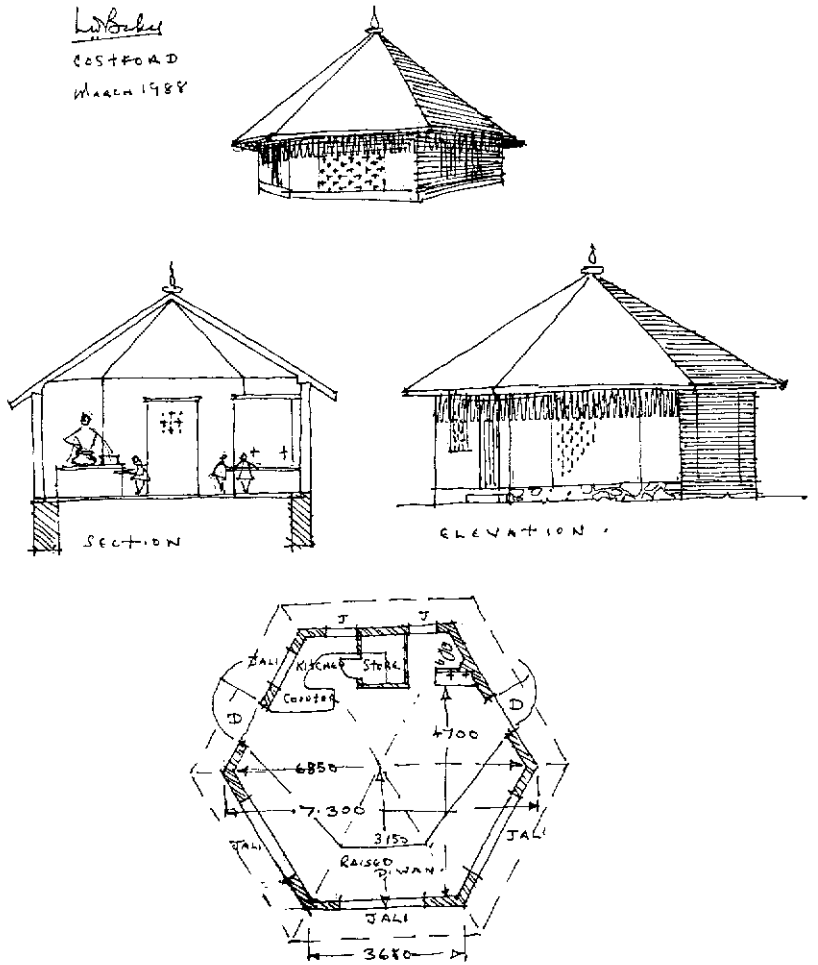


government proposed the construction of a number of low-co day-care centres. The implementation of the program was entruste to the Centre of Science and Technology for Rural Developin

anganwadi–B



anganwadi–C



(COSTFORD), a non-profit organization that helped propogate Baker's ideas. The initial sketches for the buildings demonstrated a number of alternatives that could be adapted to different locations and site conditions.

Expressing his ideas on the designing of these centres, Baker said, 'I feel sure these small buildings, to be built with a very limited amount of money, must be as multipurpose as possible. They are used as shelter,

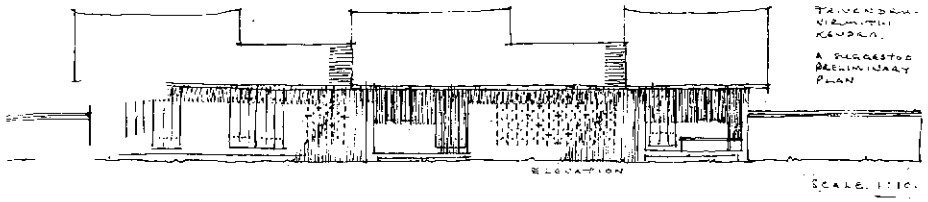
as a play-space, as a feeding centre, as rest and sleep places, as instruc tion and teaching-spaces. A simple square or rectangular plan ca accommodate all these functions but a bit more imaginative plan an structure can make it easier for different groups with different function to co-exist under the same roof at the same time.

'It is also my experience and very firm belief that children enjoy an respond to imaginative and exciting spaces. Their current life is one o exploration and discovery and we should provide them with facilities t explore and discover. It is sadistic of us to put children into hollo cubes—as most of our class and playrooms are!'

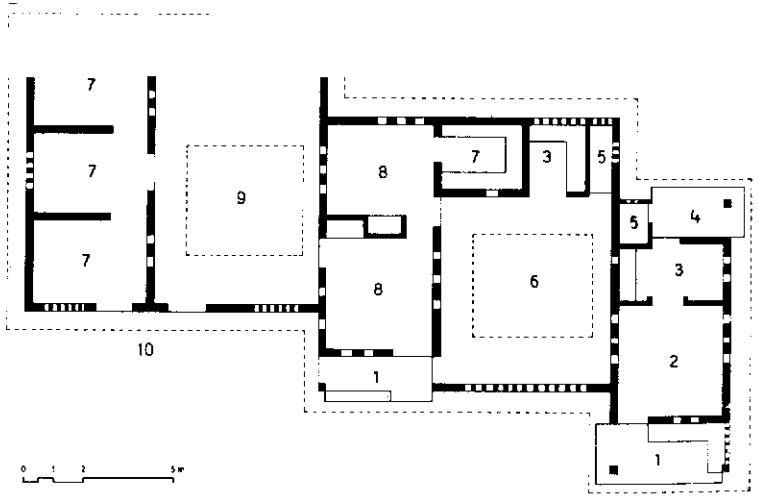
Nirmithi Kendra

Aakulam, Trivandrum, 1987

The task of disseminating low-cost building technology appropriate to

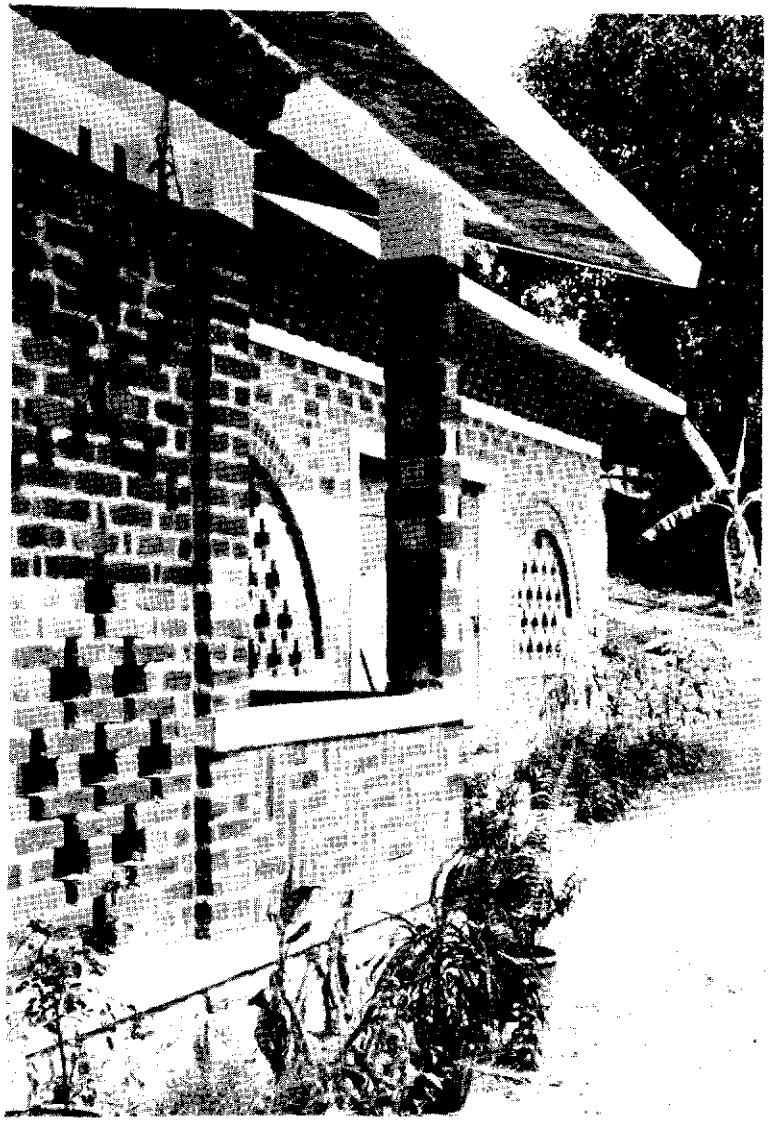


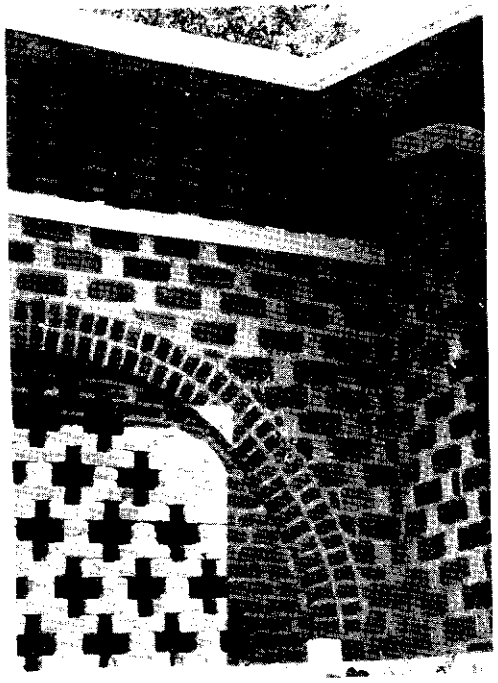
the suggested plan



1	VERANDAH	6	OPEN CLASSROOM
2	LIVING	7	STORE
3	KITCHEN	8	OFFICE
4	WORK AREA	9	PARTLY OPEN WORK YARD
5	TOILET	10	UNLOADING PLATFORM

each district was taken up by the state government through the establishment of training and demonstration centres called Nirmithi Kendras. Sketches for the first Kendra, built in Trivandrum, were prepared by Baker and later developed by architects of the Building Centre.





Office and teaching accommodation were provided for in a building that itself set an example of the ideas it was meant to illustrate: alternatives, local inexpensive materials and construction techniques.

Baker feels, 'Nothing must be done at the Kendra and in the buildings of the Kendra that ordinary people cannot acquire and do for themselves. The buildings must demonstrate the construction possibilities of a really low-cost building which is acceptable and beautiful, which is functional and suitable for the Trivandrum district, and which uses minimum energy (fuel) in manufacture of materials for building techniques and for maintenance. It must clearly demonstrate that 'low-cost' does not reduce or lessen structural stability and durability and that it is more maintenance-free than the conventional fashionable buildings. The current costs of all materials used and all labour employed in production must be clearly shown so that all can understand how cost-reduction is achieved.'

Section III

WRITINGS

Writings

A commonly held belief among architects is that a work of architecture never lives up to the ideas that have generated it. This is a belief held by architects whose thoughts and design conceptions expressed on paper suffer, for whatever reasons, unfortunate transformations on the building site. However, Baker's architecture on paper expresses exactly what he actually builds. Sketches, drawings and the notes alongside carry the conviction of a pen on to the site. Moreover, the strength of an architect's work lies as much in his buildings as in the thoughts that have generated them. As an architect, Baker's first commitment is to building, but, as he willingly admits, his architecture is the result of a personal ideology of honesty, a spartan simplicity that expresses itself in his work and life, in his ways of building, of dealing with people, of living and reacting with the members of his own family. A deep-rooted commitment to place and context is perhaps the outcome of a professional practice centred over extended periods in a single area—first the seventeen years in Pithoragarh in the Garhwal hills and the last twenty-six-odd years in Trivandrum in south Kerala.

Besides similarities of design approaches in both these places, evidence of Baker's vision is seen in his numerous published and unpublished articles, papers and seminar reports. They reflect his attitude towards conservation, of both materials and heritage; they suggest methods of architectural documentation; and they establish simplified methods for national housing programmes, in their administration and technology. In abstraction, a combination of all these ideas provides clues to what could be a common approach to building in India, and in other developing countries. The articles also express Baker's continuing quest for an architecture relevant to our times.

What an architect builds and how he does so is to a great extent influenced by what he sees, experiences and records. Baker's eye for detail, the personal unique finish, fulfilling individual needs in the

homes that he creates for his clients, are also evident in the sensitivity of his record of vernacular architecture.

This, the third section of the book begins with the architect's perception of his own architecture and an appreciation of vernacular architecture as recorded in his personal experience in Pithoragarh and Kerala. A comprehension of the changing condition in the economics of building is expressed in Baker's articles on the adaptation of new technologies to the vernacular, and vice versa, the application of vernacular principles to new methods of construction. In 'Does Cost-Reduction Mean Poor Quality?' and 'Is a Modern Indian Architecture Possible?', Baker suggests the inevitability of change without a sentimental attachment to the past.

Baker on 'Laurie Baker' Architecture

I stayed with Quaker friends who were close to Gandhiji and had the thrill and the blessing of talking with him about the lives of people in India and China. It was strange to spend time demonstrating and explaining to him how my Chinese cloth shoes were made and then later to have 'Quit India' shouted after me as I returned through the streets to the house where I was staying. During this period of enforced stay in India, I saw mansions and I saw slums. I met very great people and I mixed with many very poor, lowly people. I talked with Gandhiji about my urge to return to work in India even though the British were being urged to get out and was encouraged by him to return to India. However, I finally returned to war-torn Birmingham. Obviously there was going to be a major requirement of architects once the war came to an end. Even so, the housing needs of many of the millions of people in India seemed to be far greater and their chances of getting people to help them build extensively far lesser than those in Britain.

So, within a few months, I found myself on board a ship bound for India. I had been enrolled as an architect for a Mission which was international and interdenominational and whose sole purpose was the care of those suffering from leprosy. On my return I was sent to live in, what were then known as, the United Provinces in north India with an elderly missionary couple who were to 'teach me the ropes'. To my horror I found that I was labelled a 'Sahib', a 'White Man', and an 'Imperialist'! I had to live in a large bungalow with lots of servants and I had to 'dress for dinner' and there was a rigid code of what 'was Done' and what 'was Not Done'. Under this code I could ride a horse but not a bicycle. After two weeks I rebelled, bought a bicycle, and rode off to live with an Indian doctor at the leprosy hospital seven miles away.

There were immediate problems for me. My work was exciting. It took me all over rural India. People who contracted the disease of leprosy were called 'lepers', with all the stigma and terror that the word

carries with it. They were segregated and herded away to asylums, probably never again to mix with ordinary people. But during the Second World War a range of new 'modern' drugs were produced and some of them were found to be helpful in the treatment of leprosy. At the same time there also came about a new approach for the treatment of the unfortunate victims of the dreaded disease. If a cure was possible, then hospitals were needed where they could go to with hope for treatment. Then eventually, perhaps, they could return to normal life, instead of being ostracized for the rest of their lives.

My job was mainly to convert or replace these old dreaded asylums with proper modern hospitals and to create the necessary rehabilitation and occupation centres. But there was no precedent for this new approach of treatment. Medical experts were few and far between and inevitably had varying and even conflicting ideas about how to go about the whole new set of problems. Who was to guide me in my work? To whom should I turn to for instructions? Who actually were my clients? Were they the Mission who paid my salary? Or were they the doctors and dedicated workers who worked selflessly for the relief of the suffering of those caught up by this most dreaded of diseases? Or were they the patients themselves?

At this crossroads of my career, I had already made my choice by going on the bicycle to live in the hospital. It was the Mission that paid my salary who also decided how much money was to be used for each project. The doctors had a fair idea of what they required for their work. But finally it were the patients themselves who would actually live in my buildings, and in them regain not only their health but their hope and self-respect, and finally gain a new entry into life. What better clients could one hope for?

Soon I was swamped by a new set of problems. The buildings I was sent to inspect, their construction techniques and materials used, were nothing like the buildings I had been taught about and designed at my school of architecture. I was expected to deal with mud walls and huge cracks. I was confronted with materials I had never heard of, such as laterite. People seemed to think that even cow-dung was an important building material! I was expected to know how to deal with termites, and even bed bugs. I was warned that in a short time *the monsoon* would come. The word was spoken with such awe and fear as though a

monsoon were a ferocious, wild beast ready to pounce on me without warning. And, true enough, it *was* like a ferocious, wild beast and it *did* pounce on me with a vengeance!

In fact, during those first few months I felt increasingly ignorant and helpless. I felt less knowledgeable than the stupidest village idiot for he seemed to know what a termite and a monsoon and black cotton soil were. I had brought with me my text books, reference books and construction manuals, but a bundle of comic strips would have been as helpful. What should I do? Go back home where I belonged? The cry of 'Quit India' was louder and stronger now than ever before—would it not be better to quit?

But it was already too late to quit. I might be snowed under with all these impossible and ridiculous problems (were they really the concern of a proper qualified Associate of the Royal Institute of British Architects?), but I was increasingly fascinated by the skills of ordinary, poor, village people working with the most unpromising and crude materials with apparently almost no recognizable tools to make useful everyday buildings and articles. I spent most of my time watching these people build beautiful houses for themselves with mud and small rough stones and bamboo and dried grass and the poorest quality of timber I had ever seen. I saw round conical houses, up to six metres in diameter, built with pieces of timber no longer than a metre-and-a-half. They had round hoop purlins made of bundles of woven small twigs bound together with long fibres extracted from cactus, creepers and vines. Furthermore, these houses were built in areas that faced devastating cyclones every year and very often this type of indigenous architecture had a better chance of survival than the more 'proper' type of structure made of bricks, mortar and reinforced concrete slabs. I had, up till then, never heard of 'stabilized earths', but all over the country I saw mud walls which were treated with a wide variety of materials: from rice husks to bamboo strips and palm fibres for preventing cracks, and various liquids from calcium (lime) water to pigs' urine for coping with other problems related to the use of mud.

The incredible and fascinating part about all this new education I was receiving was that these strange systems were effective, and slowly I realized that many of the answers to my problems, which I thought I could never solve, lay before me and all round me wherever I went. I

suppose it took many years before I really understood and wholeheartedly believed that wherever I went I saw, in the local indigenous style of architecture, the results of thousands of years of research on how to use only immediately-available, local materials to make structurally-stable buildings that could cope with the local climatic conditions, with the local geography and topography, with all the hazards of nature (whether mineral, vegetable, insect, bird or animal), with the possible hostility of neighbours, and that could accommodate all the requirements of local religious, social and cultural patterns of living. This was an astounding, wonderful and incredible achievement which no modern, twentieth century architect, or people I know of, has ever made.

Columbus is reputed to have discovered America, but a large number of people had been already living there without the publicity of his discovery for a very long time. Similarly, when I made my own little personal discoveries, I realized that I had merely chanced to find an extensive set of building systems which were in no way 'discoveries' to more than five hundred million people! I wanted to make use of this new knowledge in my own work. Perhaps it was as well that my employers brushed it all aside as a romantic notion for I realized I was merely a witness to these apparently endless indigenous skills and was in no way capable of implementing them so early after my 'discoveries'.

Rather reluctantly I had to return to my drawing board and design 'proper' buildings. I can't say that the result of my latest education was wasted. I learnt more about the more acceptable local materials, with new (to me) ways of using burnt brick, stone, tiles and timber. I also used new kinds of mortar and plaster and, as much as possible, tried to design my buildings in such a way that they would not be offensive or unacceptable to my real clients, the users of the buildings, and so that they would fit in with the local styles and not be an offence to the eyes of the people with whom I had chosen to live with. I think this was probably the second biggest step towards what (if there really is such a thing) is described as a 'Laurie Baker Architecture'.

Meanwhile, the British had quit India and Gandhiji had been assassinated, and I was settled in independent India. I got most of my

encouragement and not a little inspiration from the wonderful doctor, P. J. Chandy, who had taken me into his home when I had cycled away from the sahib's bungalow in Fyzabad. As he had an equally wonderful doctor sister I married her and we settled down in a remote area of the Himalayas on the borders of Tibet and Nepal. And there, in mainly truly local indigenous style, we built our home, hospital and schools, and we lived there for more than a decade-and-a-half. During this time I did actually acquire quite a lot of those skills which had so fascinated me.

Slowly I began to be drawn back into the more sophisticated world because, strangely enough, as I was busy absorbing these local skills, people from the outside world came up into the Himalayas to get my help. Among them was a wonderful elderly American lady, Welthy Honsinger Fisher, who was concerned about spreading the teaching of adult literacy throughout India. She had the vision of a village which she'd planned to call 'Literacy Village' and it was here she would teach people how to educate adult illiterates. She would train writers on how to write for the newly-literate adults. She would teach how to use drama, puppetry, music and art as teaching methods. But she wanted, what she first described, a real 'Indian villagesque set-up'. Although crippled, and in her seventies, she'd made the long and difficult journey to our hospital in the Himalayas and stayed with us until she had her plans for her Literacy Village. Later I went down and helped her to lay out the site and start building. Some of her friends were trying to start psychiatric work in India. They were an international team but were going to work with and for Indians (the second member of the team was a south Indian psychoanalyst). They too came and dragged me away from my house in the Himalayas because, although they needed up-to-date modern hospital equipment and surroundings, they needed buildings and an atmosphere that would be acceptable and 'right' for the mentally-disturbed Indian patients. Naturally, as a pioneer work to which an enormous amount of thought, concern and devotion had been given, it was observed and studied by other branches of the medical profession as well. It was realized that the development of medicine and surgery, together with advanced equipment and modern drugs and techniques, were not sufficient to heal local patients. Particularly for treatments which lasted for longer periods, the surroundings in which the patients were kept and

treated were important factors for healing. Thus my work on hospitals and medical institutions, especially those in rural areas, grew.

In out-of-the-way districts, among the scattered and neglected population, the buildings needed were small, but whatever the size they were essential necessities—more essential and necessary than even those in the densely-populated cities where plenty of alternative facilities are available. Furthermore, those living in these remote rural areas traded by the barter system rather than by buying and selling with money. This meant that it was extremely difficult to find money to pay for the building material, and so it was of the utmost importance to design and make buildings that were strong and durable, and as inexpensive as possible. For this and other similar reasons I became very cost-conscious and spent a lot of time trying to find ways of reducing building costs in general—whether I was using local indigenous methods or building with the 'normal' twentieth century materials and techniques. Seeing millions of people living a hand-to-mouth existence made me come to abhor all forms of extravagance and waste.

This brings us to the two important characteristics of a so-called Baker Architecture—that 'small' is not only 'beautiful' but is often essential and even more important than 'large'; and that if we architects are even to start coping effectively with the real building problems and the housing needs of the world, we must learn how to build as inexpensively as possible.

And so my interest and work spread. The medical world was cautiously interested and the world of formal education also started to nibble at Baker's baits. There were village schools and colleges and even urban colleges who wanted libraries, auditoria, etc. Designing for these various institutions became my bread-and-butter. For the dessert I could never resist the invitation to design religious buildings. So, often, there were *ashrams*, houses of prayer and churches on my drawing board—but always on the condition that there must be no ostentation or 'façade-ism'. I am often puzzled by the dichotomy in my nature—I claim to believe in democracy but I can find myself wanting to be an achitectural dictator! I think I am more than normally tolerant about other people's religious beliefs and practices, and yet I can find myself decrying the requests of a religious group for something which I feel is wrong or inconsistent with their beliefs. I claim that the client's needs and desires

should come first and that he requires a 'client-based' building, not a 'Baker' building—but when expressions of his religious beliefs offend me I find myself unable to design for him.

Very briefly, the Quaker ideal is that there is a form of direct unity with the Creator, that Man experiences this at any time, in any place and under any circumstances. Special 'religious' surroundings and appurtenances are not essential, though many people find them a help. But, however much we hoodwink our fellowmen, it is impossible to be deceitful or put up a false front to the Creator. So all efforts to 'put on a big show' or indulge in deceit to make ourselves look greater than we are, seems to be quite pointless. A house has to be designed as a home for a particular group of people to live together as a family in their own inimitable style and if this planning and designing for them is done well it is highly unlikely that the outside of the building will be ostentatious or showy. It is even more so with religious buildings where people usually gather together for purposes of worship and prayer, with their own particular form of ritual or liturgy. The architect will do his utmost to provide the 'right' space in which these acts of worship can be made. As this mainly concerns our search for union with the Eternal it seems particularly 'not right' to indulge in a pretentious façade with these buildings. This anti-façade-ism has definitely been a very noticeable and is a deliberate characteristic of Laurie Baker's architecture, no matter what type of building is being designed.

It was towards the end of our stay in Pithoragarh and while these interesting, special buildings were being built that the government itself started mild enquiries, especially concerning the possibilities of cost-reduction in building. Senior government secretaries showed genuine concern at architectural practices which were apparently not actually essential or even desirable, but which they were assured were necessary. At first I was only unofficially asked whether there were in fact any possible ways of reducing costs for government buildings done by government agencies. My unpopularity among fellow professionals probably started at this time. I remember being shown drawings of a monumental façade to the proposed State Archival Buildings. The entrance portico looked very much like St. Paul's Cathedral West Facade with a huge flight of steps and rows of ornate columns. The public would not use this building and those who were to work in it

would number less than forty. I asked for the reason for the great entrance portico the answer I received was that it was because Mr Nehru himself would declare the building open! Needless to say I enjoyed these skirmishes with the government personnel and eventually became an official adviser.

For a number of a reasons we pulled up our roots from our Himalayan home and moved south to the State of Kerala with its extremely beautiful local indigenous bamboo style of architecture. Again, at first, we chose a remoter rural area to live and work in, and again, we ourselves built our own home and hospital in the local style with local materials. We settled down to live in a completely different setting from that of north India. I found the relationships of Kerala to India very comparable to that of Britain to the rest of Europe. The people were 'insular' and proud, and their ways were very different (and in their own eyes superior) to those of others. Many more people were educated and literate, and this was especially true among the women folk. This had both advantages and disadvantages. For example, there were many very attractive ways of using local building materials. The coconut palm leaf was split and the fronds plaited together to form a thatch which was pleasing to the eye and of extremely good insulation value. The plaiting work had always been done by the older girls in their spare time, but now almost all girls went to school and more and more of them to college and there was neither the time nor the inclination to make these stocks of thatched leaves ready for the annual re-thatching. And so, for similar reasons, there was a strong move everywhere to abandon 'old-fashioned ways' and go in for 'modern' buildings using plenty of cement and reinforced concrete.

I had little time for the usual sharing of my wife's hospital work as I became more and more involved in building activities. Many people and institutions showed great interest in reducing costs of building. It all started when the Kerala Bishops' conference had tried to find a way of working together for the good of the common poor man. They had, with great fanfare, agreed that each parish in the state should try and put up at least one inexpensive, small house and give it to the poorest family in that parish, regardless of caste or creed. But after three years only two or three houses had been built. The Archbishop Mar Gregorios of Trivandrum called for a 'post-mortem' seminar to find out the reason

for this failure. The explanation given by all was simple enough—there was no longer any such thing as an 'inexpensive building'! I offered to demonstrate, rather than to talk about ways of building inexpensive houses and spent the following two weeks putting up a small house of about forty square metres and costing, by request, less than Rs 3,000 (about US $400). The participants of the conference came to see the result of this demonstration and to our amazement declared the house to be 'too good' for 'the poor'. So the Archbishop asked for a second house to be put up for half the cost.

From this beginning there followed many small houses, schools, clinics, hospitals and churches and then the government moved in to examine what was going on. The Chief Minister of the state became a convert and I built the State Institute of Languages, at his request, for a small sum of money which the Works and Housing Department had declared was impossible. But my work for government and semi-government institutions continued, notably with a fairly large and prestigious complex known as the Centre for Development Studies, staffed and run by world-known economists of repute. The Chief Minister launched the scheme by challenging them to demonstrate and prove their economic theories by the way in which they built and ran their institution.

At this time, my greatest problems came from the vested interests of most categories of people concerned with the building industry. Most of them were paid on a percentage basis of the total or partial cost of a building. Clearly they did not wish to reduce costs! The craftsmen also were similarly paid and they too did not want any changes. It became increasingly tiresome when people who asked me to design a building for them for a certain sum of money, would return to say that the builders said it could not be done even for double the figure I had given. There was only one thing to do and that was to get together a band of masons and carpenters who would do what was asked of them and who would learn new techniques and un-learn old, wasteful ones. It was rewarding for my clients, for me and for the workmen. For example, some of them became excellent brick-workers who got enormous satisfaction from producing beautiful brickwork. Much of what has come to be described as Baker Architecture I owe to these craftsmen. Because of them it became easy for me to construct almost any type of building,

and these ranged from the smallest houses to a large cathedral seating three thousand people. I was particularly pleased that three housing groups were taking advantage of these ideas. A whole fishing village, for example, was built after many of its old huts had been washed away by the sea in a gale. Several institutions also built houses for their poor at comparatively very little cost. Then the so-called 'upper strata' of society came forward with interest which proved to be genuine, when quite a lot of them asked me to build their houses for them using these simple, cost-reducing techniques.

Low-cost housing techniques were the most rewarding for the group of people who came under the label of the 'lower middle class'. They feel they have certain standards of living to keep up, matters relating to dress and to the education and marriage of their children, but their salaries leave them very little to save for house-building—an activity which they had always considered well beyond their reach. Now they could build. They were quick to understand the principles involved in cost-reduction. They were quick to understand the real priorities of building a home. They had and expressed their faith in the 'expert', and would sometimes actually help where they felt they could.

Again the government showed further interest and called for a report on the methods of cost-reduction. There was strong opposition to the idea of requesting a private individual with 'funny' ideas to present an official report to the government. Three outside government experts joined me and the report was presented, and, accepted, after the Chief Minister had organized a seminar in which all the suggestions and recommendations in the report were thrashed out and either agreed upon as possible and feasible, or, if impossible, rejected. Finally everything in the report was accepted, but over the years very little of it has been implemented.

Industrialists are often hard realists and the principles of cost-reduction have been taken up by some of them in different parts of the country. It seems a far cry from small 'low-cost houses' to big foundries and factories, but that is what has happened. The wheel seems to have turned a full circle because it is these indusrialists who are now employing many handicapped persons and my work for the industrialists includes hostels and training-centres for these handicapped people, along with their huge factory buildings.

Lastly, I have found, consistently, throughout my working life, that the whole business of planning and designing is intensely absorbing *and* fun! Always living close to nature I learnt many lessons from the design of God's creations. Very rarely do we find the square or the rectangle but very often the circle is used. The straight line is rare, but the graceful curve is frequently seen. An interesting scientific observation is that the length of the wall enclosing a given area is shorter if the shape is circular and longer if the shape around the same area is a square or a rectangle. This is an important factor in cost-reducing excercises! Furthermore, I have found the answer to many spatial and planning problems by using the circle and the curve instead of the square and the straight line—and building becomes much more fun with the circle.

(unpublished)

Building Technology in Pithoragarh

The prime concern in the paper is with the lives of the people who live in the remoter and more scattered communities of the mountain district of Pithoragarh. I lived near Pithoragarh in the 1940s when there were no motor roads. Scattered villages and hamlets were linked to each other only by narrow tracks which ran either along the contours of mountains or climbed up from river to mountain-pass and then down again to the next river. My wife was a doctor and, although our hospital was nearby, we had to travel widely to visit patients who were too ill to be brought over difficult mountain paths to the hospital. We therefore got to know the countryside well and, more especially, the ways of living of the people with whom we lived and whom we treated. As an architect, I was always also extremely interested in their building constructions and the functional way in which they planned their homes.

One of the things that Mahatma Gandhi had said, that impressed me, and has influenced my thinking more than anything else, was that the ideal houses in the ideal village will be built of materials which are all found within a five-mile radius of the house. In my training as an architect, I have seen clearly wonderful examples of Gandhiji's wisdom all around me. The wood for the roofs was obtained locally and was extravagantly lavish in size. Whole tree-trunks were used for ridge-poles, purlins and trusses. A layer of split-pine was laid over thick rafters and carried the split-stone or slate-roofing which was bedded in mud. All these roofing materials were close at hand. Occasionally a wealthier person would send for a thinner quality of slate a few miles away. This whole roof construction over the wall construction was completely adequate to cope with the climatic extremes of heat and dryness in summer, the violent rainstorms in monsoons and the heavy snow in winter.

In planning, the houses were similarly simple and functional. Almost invariably they were built along the side of a steeply sloping hill or

mountainside. So split-levels were very common. Unnecessary excavation was avoided. On the outer lower side was the *ghot*—cellar-like rooms with only one outer wall which was full of doors and windows. Usually the *ghot* was occupied by the cattle; sometimes part of it was also used as the kitchen; and there were, sometimes, store rooms down below. On the next half-level up, but on the opposite and sunny side, was the lean-to veranda, with its low door and its low balcony-like arched carved windows with wooden shutters. Here was the main entrance to the house and it was also the entertaining and the sitting part of the house. One could sit in the winter light coming in at a low angle, or in summer, when one got the breeze and the shade to keep cool and fresh in the sultry summer heat. At night the shutters were fastened and the low-roofed room quickly warmed up as the family sat around the *angeethi*. On the third split level, above the animal *ghot*, were the private, square, dark rooms—they were a mixture of bedroom and store room. Often even the cooking and eating took place in one of these inner rooms which gained added warmth and heat from the animals below.

Village planning and site utilization were equally functional and simple. Usually there were rows of houses all joined together (sometimes, when three to ten or twelve brothers with their families lived in such a row of houses the front veranda was common to all). These multi-housed rows of dwellings were usually under one big long common roof. The rows followed the contours wherever possible, and, consequently, were sometimes curved. The row of houses was usually sited to overlook the terraced fields below, to catch the sunshine, and to get protection from rain, snow and cold winds from the forest or the steep hillside behind and above the row.

To me, this Himalayan domestic architecture was a perfect example of vernacular architecture—simple, efficient, inexpensive. This delightful dignified housing demonstrated hundreds of years of building research on coping with local materials, using them to cope with the local climatic patterns and hazards, and accommodating to the local social pattern of living. It dealt with incidental difficult problems of building on a steeply sloping site, coping with earthquakes and avoiding landsliding areas and paths. The few examples of attempts to 'modernize' housing merely demonstrated, only too clearly and adequately, our

modern conceit and showed how very foolish we are when we attempt to ignore or abandon the hundreds of years of 'research' that goes into local building methods.

But what do the people who still live in the Pithoragarh district think of their actual housing needs?

I want to know what the inhabitants think of their own houses. Some of you may come originally from Pithoragarh—but now you have become urbanized in Nainital or Bareilly or Lucknow or even Delhi. You will be suggesting proper kitchens, bathrooms, latrines, chimneys, smokeless *chulhas*, glass windows, brick walls, concrete floors and roofs and so on. But my experience has shown that such 'improvements' create problems worse than those which they are supposed to remedy, and that they are rarely appreciated by the people who have to live with these 'advancements' and 'developments'.

Quite frankly, I wish to question whether there is an actual housing need in the outlying villages?

If there is any express need for more housing in the remoter areas, then what are the current problems and difficulties in building the normal traditional type of house?

Almost certainly there will be complaints about the rise of prices, particularly of labour and timber. The rise in labour-costs is something that has come to stay and there is little that we can do about it. In Pithoragarh, almost all the costs of a building were labour-costs. Stone, for example, lay on the ground next to the house site—the entire cost of producing stone lumps, ready to assemble, was one of labour. It involved levering out the layers of stone and carrying them as head-load to the masons building the walls. This is in contrast to the brick areas where, besides labour, there are several other manufacturing and transport costs involved. The other big problem is timber. There has been a lot of timber-felling, particularly uncontrolled felling of privately-owned timber, which has not been replaced by new planting. In the state forests there was always proper control of felling, but now that the country is aware of the value of timber and of the fact that these forests are not limitless (but have a definite measurable content which has decreased drastically over the last quarter of a century), timber has joined the rank of luxury items and so we can no longer afford to use it lavishly.

We also have to remember that there will be other modifications with regard to planning and details of services. These will be related to other problems, such as the increasing problem of fuel. Till now, of course, all cooking fuel, and even most of the lighting fuel came from the forests. This has now been curbed and other fuels are being used—this is bound to have an effect on housing.

It is an accumulation of all these various changes that makes the old 'deal' (Gandhian!) sort of village house inadequate and deficient. It is essential for us to decide what we actually mean by these currently fashionable terms—'intermediate', 'appropriate' or 'adaptive' technologies! My own interpretation is that these technologies are those which show us the easiest, simplest, least-expensive but efficient ways of dealing with everyday problems. Such technologies are affordable, as the commodities required are easily available and so are the skills needed for the job. My observation is that vernacular architecture almost always has apt solutions to all our problems of building. All that is required is to go a step further with the research our forefathers have done—that is, to *add on* our twentieth century experience to *improve on* what has already been accomplished. But this addition should be a contribution—not a contradiction.

Science and Rural Development in Mountains
(edited by J.S. Singh, S.P. Singh and C. Shastri,
Gyandoya Prakashan, Nainital, 1980)

Architectural Anarchy

People who come to Kerala almost invariably express delight in its architectural styles. Until a few years ago each town had its own distinctive character. There are many factors which contribute to this character-formation. One relates to town-planning. Old towns usually started as very small settlements and slowly grew into towns. This meant that often there was no road system to begin with and it only came slowly as the need to communicate with other places arose. Even then, the roads meandered to avoid hazards and natural features such as hills and rocks, trees and water, or old religious buildings that they felt should not be moved. So right from the start every location itself determined the original basic layout.

The other factor is related to the construction of buildings. Before these days of easy, but costly, transport, people built only with the materials that were found nearby. For example, you would not find any buildings of burnt brick in an area of rock and stone. As the local materials varied from place to place, so did the appearance of the building constructed with them. The variation was found not only in colour and texture and but also in the shape and/or height of the building. The materials also determined the shape and size of the holes in walls for the doors and windows.

An important factor in determining the character of a town is the living patterns and social habits of the people who inhabit it. Each community and settlement evolves its own special pattern of living, its own idea of culture and religion. Indeed, architecture is the way in which groups and communities use local materials to construct buildings which will cope with the local hazards, natural features, climatic conditions and cultural, social and religious patterns.

Some special features are obvious in the buildings of old villages, towns and cities of India. The first is the simple, straightforward, honest way of using local materials. For instance, in areas where the local stone,

is smooth and sleek, such as marble, the builders have exploited the characteristics of the stone resulting in smooth and elegant buildings. Where forests abounded, buildings made use of wood. But as there are many types of timber, there are different ways of using wood of different kinds. All this is fairly obvious, but the point I want to make is summed up in the word I have used to describe the use of materials—the word 'honest'. Put simply, it means that a brick wall looks like a brick wall and you could, if you so choose, count the number of bricks on it. A stone wall makes use of the sparkling quality of granite or the rich colour of standstone.

Another result of this honest use of local materials is that the architecture is not confined to the main buildings but integrates, in its design, all of the immediate surroundings, such as walls, gates, seats, water features like fountains, posts for lights, paths, paving and steps.

The factors I have mentioned so far give a unique harmony and unity to each old town. But there is another major factor of design that forms the character of towns—the factor of scale. This means that all the details in a building are related to the size of the human figure. We know that the height of most adults is between five and six feet. When we look at the façade of a building and see a door in it, we know that it is a little higher than ourselves, that it is probably between six and seven feet. In this way, without measuring or calculating, we can roughly judge the size of buildings and rooms by merely looking at the door. Of course, there are exceptions, as the entrances to special buildings such as temples and churches. These often have large doors for ceremonial purposes through which banners are carried and elephants pass. In these cases the scale of the building is lost unless there is also an ordinary door somewhere. The question of scale was obviously understood by our forefathers and has proved to be another strong unifying factor in determining the character of a town and its domestic architecture. Furthermore, this adherence to scale provides a harmony and unity between buildings of different ages. In most of the old towns some buildings may be hundreds of years older than others and while systems and techniques of building construction slowly changed through the centuries, the continuity, harmony and unity was maintained by the use of the same materials, the use of scale and a continuous relationship with the size of the human figure.

All that I have said applies particularly to the various styles of architecture in Kerala. Local materials have been used simply and honestly. One can see what the foundation is built of, what materials are used for the superstructure; and the details of the beautiful roof timbers cleverly designed to carry tiles or thatch. The scale is consistent and, again, honest.

In Japan, China and Korea, the original basic style stemmed from the use of bamboo. Bamboo is long and flexible—rarely straight, but usually gracefully curving. This is particularly expressed when it is used as the roof's ridge pole, carried between two forked poles. It sags in the middle and soars upwards, at the ends, beyond the points of support. With the development of tools, bamboo-workers graduated to carpenters and the wood they used was often from palms and tended to curve gracefully. Kerala has a hot, wet, humid, tropical climate, so the roof pitch is steep and the eaves come down low to protect the walls from heavy rain and, at other times of the year, from hot strong sunlight. Rooms in the houses were mainly used for storage and for brief periods of privacy, and were therefore small. Deep, shady, cool verandas were used for living purposes. There was very little difference in urban and rural buildings.

But what have we done in the second half of the twentieth century? Is there any new town in Kerala, or any new part of a town in Kerala which is now worth going to see for its strength of character or beauty? If there is, I have missed it. All that one can see today is a growing hotch-potch of many-storeyed buildings in the so-called 'modern' style. Rarely is any natural material, whether local or imported, visible. All structural elements—mainly reinforced concrete frames with fewer load-bearing walls—are hidden or clad with cement plaster, paint, glass, aluminium and such like. Scale has been completely abandoned. There are pointless and functionless protrusions, frills and fins that have little or no relation to the rooms and their functions. Façadism, a thing unknown in the traditional Kerala architecture, is rife and it is here that the scaleless fins proliferate. Each separate building is an expression of anarchy with no thought of harmony, unity or honesty with itself, let alone with its neighbours or with the environment.

The contemporary approach seems to be towards an architectural anarchy of ruthless arrogance. Instead of the harmonious, honest, traditional architecture of Kerala, we now seem to prefer a senseless jumble of high-rise concrete structures, each unit clad in the most unsuitable materials we can think of. The scene is of strife, division, violence and communalism. Perhaps we are merely reflecting the present-day social milieu of strife, divisions, violence and communalism in our architecture. In being modern, virtue has gone.

The India Magazine
August 1984

Is a Modern Indian Architecture Possible?

In most countries of the world architects are being accused of failing to produce a modern form of their own previously-distinctive architectural styles. If one or two typical modern buildings from each country could be transported and put down in isolation in a large flat desert, could any of us, even architects, walk from one building to another and say 'Ah! A modern Fijian masterpiece' and 'Wow! Just look at this one—pure Italian' and further on 'My! This is obviously an Indian effort!' A hundred or so years ago we could probably have been successful with such identifications, but there are very grave doubts whether we can do so now.

Does this mean that we have failed in our job?

Fifty years ago we were taught that a building must have an identity. We could certainly tell by looking at a building whether it was domestic or commercial or industrial and so on. It also had its geographical and cultural characteristics. In India there is an incredible wealth of regional architectural styles, and there is not the faintest possibility of confusing one with another. Even where the same materials have been used for building, the climatic, cultural and regional variations are so great that different methods of construction have been used to produce unique individual styles. Further, these distinctive styles apply not only to big and important buildings but also to the smallest domestic structures. Really we can say that the buildings of any small district are a quintessence of that district's culture and skill.

But these distinctions cannot be found anymore. What has happened?

For one thing—cement. Modern Portland cement came and suddenly our slow, steady, evolutionary building process came to a devastating and tragic halt. Cement and steel were joined in holy matrimony and lo!—their child was this universal anonymous expressionless 'modern

architecture' which tells you nothing except that reinforced concrete has been lavishly and brutally used. The saddest thing about it is that reinforced concrete is a wonderful material that can do almost everything fantastic and exciting. It can stand, soar, twist, hang, swirl, gyrate, encircle, defy and placate. But we rarely ever let it do any of these exciting things. We merely imitate the building practices of the Dravidians, with their square stone pillars and split stone beams; and when in a very dare-devil mood we cantilever out the beam-ends to an uncomfortable length, we think we are really and truly 'modern'.

Of course, we have a third deadly material, glass—with which we fill in all the holes. The result of this modern but static style of architecture, is that everybody's buildings, be they in Bombay, Birmingham, Bologna or Buenos Aires, look the same.

Consolingly, 'high technology' has also taught us that there is no need to concern ourselves with the weather or the functions for which the building will be used, or the variations in the cultural patterns of our clients—'high technology' applique-work can cope with all this old-fashioned 'nonsense'.

I think the time has come to ask ourselves a lot of questions. Could we have done something different? Should we have done something different? What does 'modern' mean? Can't we be 'modern' with other materials besides reinforced concrete, glass and aluminium trimmings? Can't we go back to the year 1 BC (Before Concrete) and carry on with that wonderful history of research and development by applying twentieth century knowledge and know-how while still showing love and respect for all that has gone before us?

Perhaps speed has been one of the major contributing factors leading to that catastrophic break with tradition. It probably took a thousand years for us to find out by trial-and-error how to make a mud wall impervious to rain and wind, another thousand years to learn how to keep termites out of it and another two or three thousand to learn how to build multi-storeyed mud buildings. But we did do it, and our enemies on the other side of the hill also did it, though in their own way which was different from ours. Now 'developed communications' has taken the 'wonder material' to all the corners of the earth and we have

succumbed to it like children falling upon a dish of instant hot cakes. So we all have identical pot-bellies and have forgotten 'mother's cooking'. Fortunately, the rebellion against 'instant mixes' has already begun and there is a yearning for 'fresh-compost-fed-vegetables and wholemeal-bread'—so may be there is hope that we too as architects, can, as our road signs say, 'Stop! Look! Proceed!'

In view of the fact that there are over twenty million families in India without any sort of shelter, that we have to import cement from Korea to make up for the shortfalls, that we are using up a lot of our energy resources at an alarming rate, and that we have bred some of the top brains in the world of science, we should, for instance, in areas where mud has been the traditional staple building material, show how modern we can be with mud! Where burnt brick has been the main building material can't we produce bricks with less energy and use them in a modern way? There are experiments which show that this sort of thing can be done along with the new wonder materials to produce buildings that are 'modern', beautiful, characterful and identifiable with a particular region and its people. For example, in the State of Kerala there is high rainfall, strong winds, powerful tropical sun and a lot of humidity. The result of ancient research and development work was a steeply-pitched roof which threw off torrential continuous rains and protected walls and rooms from the glare and heat of the sun. It all made good sense and good architecture. But concrete and glass towers are incredibly expensive because of all the antics required to cope with rain and sun, and they are quite stupidly useless without the air-conditioners, fans and louvres of aluminium strips. Can 'modern' architecture only be vertical of wall and flat of roof? Couldn't we throw off rain and protect from sun *and* show that we are doing it effectively, even by being 'modern'?

Since the beginning of recorded art, India's brains had devised the *jali* (trellis, lattice, honey-combed walling, pierced stone and wooden screens and walls) to filter the glare and strong sunlight into cool but breeze-filled rooms. India has used this device more than any other country and it is essentially an Indian device. We can study the many and varied components of Indian architectural design and find out what makes them essentially and intriguingly 'Indian'. Only then can we

create an Indian-ness into all our materials and designing. *Then* our 'modern' 'Indian' architecture will be a continuing, growing, crowning glory to our great heritage.

Spazio Societa
Milan, 1986

Architecture and the People

The theme of this essay is Architectural Awareness. The dictionary defines 'awareness' as being conscious, alert and mentally responsive to something. Architecture is the style and method of design and construction of buildings or the art and science of building. So our subject is about our consciousness, alertness and mental response to the art and design and construction of buildings.

The subject given to me is 'Architecture and the People'. Did the promoters mean *the people*, or could they have said 'Architecture and People'? Saying 'the People' implies that we architects are in one category and *the people* in another. It sounds a bit like royalty talking about 'my people'—implying a large conglomeration of lesser mortals. So for the sake of this discussion I will accept this title of 'Architecture and the People', and put myself in the position of the architect looking at all my clients (who are supposed to know nothing about architecture) and the millions of people who have no option but to look at and accept 'our' architecture.

But what do architects and what do the people have in their minds when they hear the word 'Architecture'? I unobtrusively tried to find out what the people think—and found that a very large proportion, especially architects, think of the word with a capital 'A' and feel that it mainly applies to 'proper, big, important buildings'. In fact for most of us and for the people the word architecture would be immediately associated with something as grand and magnificient as the Taj Mahal of Agra. So, not surprisingly, when I am wandering through a village or an old town, entranced and fascinated by the old buildings and happen to make some such remark as 'what fascinating architecture', there is a tendency to get a response as 'where?'—because there is no temple or town-hall or tower in sight, but only thatched and tiled houses and shops.

This indicates that we are on different wavelengths, even about our own profession and what it means to us. So I appeal to all to have an open mind when we listen to each others ideas!

From the many years of experience in Pithoragarh and Trivandrum I learnt what Indian architecture is. I did not learn it from books or from architects, but from ordinary village craftsmen, carpenters, masons, mud-workers, thatchers—in other words from ordinary people, *the people!*

When I first moved to India, my headquarters were in Fyzabad in the state of Uttar Pradesh. How could I build and design for the extremes of climate found here? At times we were freezing and at other times the temperature went up to 115° F. At times it would rain cats and dogs and at other times the ground was so dry—like concrete with a layer of dust over it. When the sun beat down after the monsoons, it was like being in a steambath; when the *loo* (hot winds) blew, everything we ate would be gritty and sandy. The following week I would be in Bihar, or Kerala, or Maharashtra or Orissa—every place having its own climate. In some places the land was all sand, other places had reclaimed backwaters and swamps, and in yet others, laterite and black cotton soil were found.

Another impression, of the local traditional architecture, that was formed as years of designing and building went by and as I travelled and worked over the country with the enormous variation in materials, construction techniques, and design, was that the quality of architecture did not depend upon the size or significance ('importance') of the building. Most huts had admirable and delightful proportions and shapes. There was an incredible honesty and a strong aspect of truth in all the indigenous buildings. Mud looked like mud, but its application was well-controlled and often the hand-work marks gave decoration and scale to the walls. Mud was never made to look like some 'superior' material. Brick also looked like brick, and, again, ingenious patterns often gave beauty and scale to the buildings. Rough stone was not smeared over with plaster or some such covering material—it looked rugged, strong and stone-like. Timber-work had a wonderfully rich variety of joints and finishes. The people relied on the honest use of materials. Thus all the answers to my problems came from *the people*. I

continue to be amazed and thrilled at the practical knowledge, principles and skills which *the people* have.

During this period I lived and moved through a wide range of cultures and religions. The caste and community feelings were still very prevalent. On the trains there was Hindu *pani*, and there was Muslim *cha*! People not only had inherited building and planning principles but they also had superstitions passed down to them. I was told that the grinding stone in the kitchen must not look at the fire, that the occupants must not open the front door and look to the south, that the kitchen must face a certain direction. At first I rebelled against these—but slowly I found that although these quaint notions looked like superstitions, since the people could not give me an explanation, more often than not there was a rationale behind them.

This experience led me to realize that the architect is only an 'extra' to the total architecture of our country. Many will probably think that this is sentimental rubbish—but I can only direct you to study the National Census, or to walk with your eyes open through any village, town or city, and you will see that it is unlikely that we architects have had anything at all to do with more than 0.001 per cent of the total number of buildings in the country, and that much of our indigenous architecture is of a high quality of design.

I am now convinced that good or bad design, or good or bad taste has little to do with colour, or form, or texture, or costliness—but that it has only to do with honesty and truth in the choice of materials and the method of using them.

I have had the pleasure and the privilege of living and working with various remote communities and tribal groups—each with their own distinctive architecture and all with the simple, honest use of materials. I am continually amazed at the care taken in simple effective detailing. Beautiful doors without hinges, strong effective valleys and gutters in roofing, unorthodox but good bonding. They also know how to improvize and adapt to make the buildings more efficient and the living conditions easier. In Andhra, there are energy-efficient *chulhas* made from broken water-pots. In Tamil Nadu, old cow's horns are embedded into the wall as a clothes-hanger. All over the country a variety of

ingenious and decorative shelves and recesses are found in thick walls, and sleeping and storage lofts above the lintel level. All this shows a mastery of a three-dimensional approach to the use of space.

The following are my conclusions from a lifetime of building with *the people*.

> *First:* I have never had any personal doubts about who my real clients are. They have never been to me categories—'tribals', 'fishermen' 'HIG' or 'EWS'. They have been people with names and with personalities.
> *Second:* I have never doubted that in a country like ours any of us has any right to squander or waste, or use unnecessarily, money, materials or energy.
> *Third:* After my first few months in India I never doubted the inherent and inherited ability of *the people* to know what good architecture is. With limited resources they have built for themselves effectively and well; and we can learn from them!
> *Fourth:* Personally, I am not happy designing buildings by sitting in isolation at a desk in an office. My designing comes into my head while I am with the clients on their site—and I believe, like *the people*, in improvization and alteration, as the work proceeds.

To conclude, almost certainly your ideas and mine of what an architect should be, are likely to be very different. Probably you are right—but I have no regrets about the ideas I have formed and the training I have had during the past forty-eight years from *the people*! Unfortunately, their inherited skills and knowledge are now being forgotten, lost and ignored. I think it is up to us to try and keep them alive by helping them improve on what their parents have passed on to them, to accommodate for the constantly changing and increasing needs as their numbers grow.

(unpublished)

The Industrial Designer and Housing

My work is entirely connected with providing shelter for people to live and work in. My field is a wide one and I am often asked to help solve the building problems in different parts of India. The requests come from all strata of society.

India has over six hundred million people and over three hundred million of them have to try and live on less than one rupee per person per day. Over twenty million Indian families have nothing that can be described as a house to live in. The urban dweller needs shelter, but to free himself from slum conditions he must also have an approach to his home, and he must have water and light and power, and there must be adequate drainage and sanitation facilities. The rural family also needs, in addition, shelter, water, drainage and security for his livestock, hens, goats, pigs or cows which this is all a part of his 'home'.

Having tried to understand the housing needs of the people of India, I must try and think what sort of a building I can design for the average Indian to live in. But who is an 'average Indian'? I have to remember that he lives in rural surroundings (about eighty- five per cent of the population is rural) and is occupied with work for only seven months of the year. When he has shared the money that he earns in one year with his family dependents, he has less than one rupee per day to spend on all the things he needs for a living. He is labelled as 'unskilled'. Though this means that he is unskilled in wage-earning jobs, I personally believe that he is actually very skilled in the many small ways which make life possible for him.

So, to solve the problem of housing, I must concern myself with this 'average Indian'. He himself cannot, and does not, commission me to design for him. I receive my orders and instructions from the government and other institutions. But I would be a wicked blind fool if I design only for those who can afford to commission my services as an

architect. Is it not possible to remain realistic and design for the 'have nots'?

I believe it possible, but I desperately need the help of industrial designers. The picture of need is not so desperate as mere statistical figures indicate. India is a vast country nearly two thousand miles wide and two thousand miles from top to bottom. Man, all over India, has shown in his vernacular styles of domestic architecture that he can make use of the locally-available, plentiful, simple, inexpensive materials immediately around him to protect himself from the weather—from rain and snow, heat and cold, strong winds, cyclones and floods. He has shown how he can use them to fit in with cultural and community pattern of living and how he can use them to protect himself from other men, wild beasts and animals, reptiles and insects. In such a vast country as India we therefore have hundreds of these vernacular styles which sometimes vary within every few miles—if slightly, but very significantly. So as an architect, and with you as industrial designers, we have a solid strong efficient spring-board from which we can launch our attack on the problems of the 'average Indian' for his housing.

Now let us look at the many component parts of the building.

We need foundations which carry our buildings on soils that are often poor and uncooperative—such as black cotton soils, loose sands, soils that are ever rich in organic matter, soils that are waterlogged. Usually, the vernacular style copes with this problem but we must see whether we can add on to the solution of these foundation problems. At present I am experimenting with surface ring-beam foundations using very simple and crude concrete reinforced with materials such as bamboo.

Above the foundations are walls which must stand up for a lifetime. They must not crumble or erode or provide homes for reptiles, insects or termites. They must not need too much maintenance or frequent replacement. There are many traditional methods of building walls. Can we, with the twentieth century know-how, make any improvements or reduction of cost without reducing their strength and durability? I have confined myself to the use of traditional materials, but I find I am able to improvize on some of them, for instance with improved stabilizers of soil so that walls are termite-free or fire-resistant.

The walls are pierced by openings with doors and windows. Doors should be strong and protective. Windows have many functions and every window need not necessarily cope with every function. So we often *over*-design them. They are often far more elaborate and therefore more expensive than needed. The many functions a window serves are: to look out of, to let in light, air, or to let in light but keep out wind and rain, or to do all of these things but remain protective and provide security, or perhaps to perform different functions at different times.

The roofs give protection from rain, wind, heat and cold and at the same time provide security. Again, I have mainly used traditional materials and units; but often the cost can be reduced by using materials in different ways, or by introducing a system common to one area another area where similar materials are to be found. For example, often people clamour for solid concrete roof slabs for security, long life, and resistance from fire, but these are far too expensive. I have used waste Mangalore tiles, or clay pots, or forms of hollow or light-weight bricks as fillers in a grid-slab system. This reduces cost and improves insulation.

Floors must wear well, not crack, and be easy to clean. They should not let moisture and cold rise from the earth beneath. I have tried simplified mosaic systems and have also tried to re-introduce various forms of old-fashioned country clay flooring tiles. I have tried long and hard to persuade tile manufacturers to give us simple, strong, inexpensive flooring tiles using salt or load glasses, but they say people will not use them. People say nobody offers them to us except at exorbitant costs. And again surely there are possibilities from the use of waste materials? The green coating of the coconut shells have been used to make hardboards by hot-press methods. This could be developed as a cheap, strong flooring material.

Sanitation is often lacking in our homes mainly because the currently-available devices are intricate, poorly-designed and very expensive. The ordinary wash-basin, for example, is a shocking corruption of the nineteenth century European device of their ideas of sanitation and cleaning. It is *not* convenient or suited to Indian needs; and yet, as an architect, I have no option but to use these outmoded Victorian contraptions.

People need cooked food and most cooking devices are still primitive and thereby removed from the three stones to support a pot over a fire

of wooden twigs. But all refinements and developments are expensive and beyond the reach of the average purse. Fuel has become scarce and expensive. Non-conventional energy devices like the biogas plants and solar cookers are beyond the reach of the average Indian because of their forbidding cost. And industrial designers do not realize that the people who are most in need of economical cooking facilities are those three hundred million people who have to try and survive on one rupee a day.

People living in hot tropical regions do not need stuffed, heat-retaining furniture for sitting and sleeping on. Most traditional sitting and sleeping devices were built in as part of the structure. But nowadays such a system only adds to the building cost unless very carefully planned. What simple, inexpensive furniture are we designing? Can we use more multi-purpose units and can they be designed as house-structural elements too?

A man needing a house would turn to builders and artisans to convert his materials into a house to live in. But where are our new building shops? Why can't we go to a building shop and pick out the doors and windows we need; the ventilators, cupboards, kitchen and cooking devices, bathroom and sanitary units, floor and roof and walling panels or blocks, lighting and furniture fixtures which we think will suit our tastes and our purses? We find a few of these things scattered and isolated, but usually poorly designed and terribly expensive and certainly beyond the reach of our 'average Indian'.

The scope to stock 'building shops' with everything a man needs to put his home together is simply enormous. Architects, engineers and building contractors merely express the needs of the people.

Paper presented at a seminar on 'Design for Development'
(organized by the United Nations Industrial Development
Organization (UNIDO), at the National Institute of Design (NID),
Ahmedabad, January 1979)

Does Cost-Reduction Mean Poor Quality?

A look at the overall picture of the present building industry makes it clear that the cost of building is extremely high and well beyond the means of the ordinary man. There are drastic shortages of what we regard as essential building materials. There are ever-increasing labour problems and we get less and less return in skill and quality of work for higher and higher wages.

It seems likely that if these trends persist the building industry will almost cease to exist. Or else we must go through some form of revolution whose battlecry should be 'reduce costs, without a corresponding reduction in standards of quality'.

But what can be done to reduce building costs? I think we have to ask ourselves whether we really do require many of the expensive buildings that are springing up all round us. The example I have in mind concerns Kerala's housing needs. We have a State Housing Board to cope with this problem—but it must have spent several lakhs on its own seven-storey office block which has no housing in it but overlooks Trivandrum's biggest slum in which thousands of people live in squalor.

In almost all institutional buildings we find rooms with such labels as 'Board Room', 'Conference Hall', 'Seminar Room', 'Exhibition Hall', and so on. Probably all these rooms are necessary but very often they lie idle and unused except for brief periods of usage. Multi-use planning could possibly save on quantity and building cost could be reduced.

Another example of such planning in quantity is found in school buildings. In many parts of the world, rows of classrooms lined along a corridor are being replaced by a number of varying-sized teaching spaces which open freely off usable multi-purpose passages. Spaces can be used by different-sized groups, or all can be used together as one large area for joint activities. This sort of planning cuts down on quantity, space and building material and gives flexibility and openness. Here,

definitely, the reduction of quantity reduces costs and gives greater facilities for teaching and learning.

Quality, on the other hand, is not quite so easily dealt with for there are many of us who would rather have no building at all than reduce the quality of our building. However, the concept of quality means different things to different people. When we use the word in connection with our buildings it is invariably related to high-cost and/or a sophisticated finish. Little thought is given to the individual quality of the basic structural materials, the craftsmanship of those materials, or the 'surpassing merit' of the plan with its functional honesty. Such 'quality' is often only a deception, for underneath it is found poor brick or stone work with little skill of bonding, correct cornering, angles, joints, and little excellence is found in the mortar filling or vertical joints. In fact the work generally shows that the craftsmen are conscious that within a few days their work will be covered with plaster and, so, often they consider that good quality of work is a mere waste.

In such a system we need to review our sense of values. I would argue that an improvement in quality, as opposed to the apparent 'quality finish' is cost-reducing and it is an improvement to building, not a deterioration. It is a setting up of standards.

Our buildings have many architectural gimmicks which are mainly functionless. When one person covers his façade with flooring tiles, in a month twenty other buildings start slapping on flooring tiles. One man puts in two large round circular holes in functionless walls, and in no time the whole city produces round holes in functionless walls. One man paints his pebble-dashed front with tasteful shades of that entrancing colour Sunkist Dung Superdupercem with the offsets picked out in Drongo Blue-Black—and the next week every corner of the town glows with Sunkist Dung picked out with Drongo Blue-Black. We all are well aware of the cost of these fancy finishes.

Our checker-board planning and use of land is extravagant of roads, water and electricity supply services and of sanitation and drainage. Similarly, we scatter our plumbing, sanitation and electricity all over the building plans whereas a bit of streamlining would bring all these services together into a single core. Elaborate RC frames which use a lot of short-supply materials like cement and steel are often extremely elaborate and cumbersome not only to carry walls which could just as

easily have been themselves the load-bearing element, but also to provide all these gimmicks of pointless, beam-end projections, our much-loved cantilevers and protrusions, and our vastly elaborate sun shades (when a sensible roofing system would have done the same job more simply and effectively). In these spheres streamlining would bring about great cost-reductions.

Quantity will definitely affect costs, while streamlining of planning, services, structural systems, building techniques and finishes can all be done by increasing true quality with certain cost-reduction effects. I find that most cost-reduction techniques give better quality and give our architecture an Indian identity that supercedes the imitation cosmopolitan modern stuff with which we are defacing our cities today.

Paper presented at a symposium on 'Building Cost Reduction' (sponsored by the Department of Technical Education, 22 March 1975)

We Need a Programme

In the summer 1978 issue of *Shelter*, J.B. D'Souza, the country's Secretary to the Ministry of Works and Housing, wrote:

> We need a programme:
> 1. That uses up very little of the usual building materials which are so scarce, and adopts local materials instead;
> 2. That draws on a reserve of private entrepreneurship which has not yet been seriously tapped;
> 3. And that cost very little.

During my thirty years of professional activity in India I have been increasingly fascinated by the subject of the use of building materials. Naturally, as an architect, I tend to divide the population into two groups—those engaged in the building industry, and others. I have come to the conclusion (quite a long time ago) that it is we professionals who are conservative and stick-in-the-mud and often I am tempted to add the description 'obstructionist'. The layman, on the other hand, I find innovative, ingenious and full of an amazing faith.

D'Souza's first point relates to the use of materials for house building. Leaving aside materials used for electrical and sanitation works, you can almost count the list of materials used by architects, engineers and building contractors on the fingers of one hand: burnt bricks and tiles, cement and sand, steel, timber and glass. As we've started counting on to the second hand you can add stone, which they use sparingly and mainly as a substitute for aggregate in concrete, and there are sheet materials of galvanized iron and asbestos cement. Finally there are the fancy finishes, paints, and alternative metal for 'iron-mongery' and frames like aluminium. These few materials are used by housing professionals all over the country and the resulting so-called 'modern house' looks much the same, regardless of climate or location. As D'Souza implies, most of these items are becoming scarce and increasingly costly.

Furthermore, because we are all demanding the same materials wherever we build the two big bottlenecks of transport and fuel get tighter and more restrictive each year.

Now let us take a look at the approach to the use of materials for building by *the others*—that is the 'ordinary man', 'the layman', 'the people', the 'amateur', the 'do-it-yourself-because-its-the-only-way-to-get-anything-done man'. He starts off by using materials used by the professional when he can afford it. If he thinks he can use bricks, he makes use of a wide range of sizes and does not insist on oddities, such as a 'metric brick', and makes use of whatever is locally available. Some bricks are thin, some thick, some are large and block-like, others are a little more than tiles; some are solid, others are hollow; some are yellow, some red, some grey or black and others almost white, but they all get used. He uses tiles for floors, roofs and cladding. He uses the 'proper' Mangalore tile, but I have collected nearly twenty other varieties of ingenious interlocking tile. He uses the flat 'English' or 'Company' or 'Fish' tile and he has a very large range of so-called 'country' tile. (I have seen nearly thirty variations of this tile.) But we professionals stick grimly to the Mangalore tile, that is if we remain sufficiently old-fashioned as to want to use tile at all. Most people do not realize that there are several times more country-tile roofs in India than there are 'proper' Mangalore tile or RC or sheet roofs. If the country tile is used so widely, with all its defects and shortcomings, why have we not improvized on it and why do we not use it? (By 'we' I mean, 'we professionals'.)

Stone is extensively used by the 'ordinary man' wherever he finds it—and while the professionals only know about squared and random rubble (they love to cover modern buildings with sheets of thin marble which seem to come alarmingly unstuck from time to time) the layman has many ways of making use of stone—of any degree of 'hardness' or shape, regular or irregular. Optimum use of stone is made by the layman for walls, floors and roofs. Stones used include slate-like stones which are easily split into thin sheets and a variety of ingeniously and decoratively made slabs of small irregular-shaped stones.

Wood has been used by both the layman and the professional, but now its forbidding cost prevents its general free use. Here the general approach of the professional is that only teak is good enough to use

while the ordinary person has no hesitation in using the so-called 'country woods'. They are used for frames, doors, windows and *almaris*. He also uses split shingles of bark. A month ago I came across some beautiful purlins of bundles of five to ten millimetres thick twigs intricately bound together. The house I discovered using this system has been up for seventy years!

Now let us look at manufactured materials. Of these, cement heads the list. No professional, it seems, can ever think of building without a liberal usage of cement in many forms. If there is a shortage or a crisis, the work stops and the building schemes get shelved until the supply of cement is resumed. We all proclaim that cement is essential for concrete, mortar, plaster, flooring, sanitary works, surfacings, water-proofings, and so on. But ordinary people have many other alternatives. The commonest of these is lime but they also know a lot about the use of pozzolanas; or they use muds and clays very effectively in a variety of ways. Complete walls, in many areas, are often load-bearing and have lasted for over a hundred years; and in other situations and areas the same effective results are obtained by using mud and clay for mortars and plasters. In several regions of the country dry stone walls are a real work of art and the most durable. I have used this dry stone-walling technique for my own house when I first settled in Kerala. I was charged, by the local craftsman, nine rupees for a hundred cubic of walling which included the cost of collecting the rocks off the site, breaking and building them. Even now it would cost a little less than twice that.

Those who know me are aware that sooner or later the subject of mud comes into all my conversation. I have already let it creep into the previous paragraph on cement and I can't stop myself from reminding you that we professionals won't even look at the idea of using mud, let alone get down to specifying and using it. But just think of the position mud holds in the overall housing pattern throughout the country. No other material is used so extensively. As I write this, within a few hundred yards of me are many houses of nothing but mud, carrying substantial timber frames and tile or thatch roofs, and which are over a hundred years old. A variety of soils can be used. If the soil by itself is not satisfactory, there are many additives used to remedy the fault or

shortcoming of the local earth. 'Secret' techniques handed down and developed through generations are almost as numerous as districts in the land. Mud is used by itself. It is often load-bearing, and is sometimes reinforced with a wide variety of materials, besides being stabilized with another range of local products. It is used as a daub or plaster. Like pastry, it can be plain or fancy. It is used as a binder, mortar, plaster or as decoration. But none of this is even considered for use by the professional. The poor layman uses little else.

Next we come to the non-professional flair for using agricultural and forest by-products and waste. Oh, the number of seminars I've been to be told about this wonderful idea of recycling wastes, etc. Nothing much seems to have resulted from all this expensive talk and not many of us seem to have noticed that roughly speaking, about seventy-five per cent of the buildings in India contain considerable quantities of these 'new wonder materials'—like bamboo, reeds, grasses, canes, barks, leaves, stalk or even roots. Similarly, there is considerable and ingenious use of industrial wastes—think of all the wayside teashops with their grills made from strips to punched-out metal-sheeting. And in slums one sees walls incorporating effectively the use of spring mattresses, motor-car radiators, cart wheels, tin cans, bottles, chains and a host of other industrial junk!

I think I've said enough. My point is that the professional displays little but caution and distrust; while the layman shows ingenuity, imagination, perseverance and a great and shining faith. I will unhesitatingly claim that far more research and development has been done by our ancestral laymen than by present-day scientists and professionals within the building industry. So what D'Souza is asking for is for nothing new or outlandish or impossible. It also establishes the fact that we do already have a talented flourishing 'private entrepreneurship'. As for cost, whenever I spend hours struggling over the cost of my so-called 'low-cost' house, I go and look at the local people putting up houses for themselves, with perhaps the occasional help of a mason or a carpenter, and it shames and thrills me to find them talking of the final cost of houses in figures of hundreds and not thousands.

This perhaps indicates that we, building and housing professionals and 'experts', are not the right people to be tackling the vast housing problems and needs of the country today. I am convinced that with the present current ideas and systems we cannot give D'Souza the programme the country expects him to produce. I think if we are willing to eat the humble pie and seek and follow the guidance of the traditional housing experts, that is the ordinary man who has to build for himself, we may be able to go much further with this vast task of housing the homeless while we and they are still alive.

(*unpublished*)

Roofs for Roofless Millions

Swaminathan S. Aiyar's very fine article on our 'Roofless Millions' is most timely and we all need to be reminded time and time again of the terrible state of affairs concerning the huge number of Indian families without any form of shelter and millions more with not only whole families, but often two and three families all living together in only one room. Even these 'rooms' are concocted from a collection of opened-up tin cans, semi-water-proofed sacks, broken bits of old asbestos cement sheeting, and the walls are made of bits of sticks and old rags and bags. None of us should be able to sleep easily with two-thirds of our urban population living under such conditions. Add to this horrible picture the nasty details of the almost complete lack of sanitation of any sort and the fact that a window is almost unknown, and we should be thoroughly ashamed of ourselves.

Aiyar is lavish with facts and figures and his assessment of the situation is down-to-earth and realistic. His point is also well taken that there is no going back from this flow of population from the villages to the cities. It is unfortunate and sad that the biggest flow is to the few, really overcrowded, large cities. This is merely because there is a similar flow of business and industry in the same direction. To build up facilities and amenities of the larger towns and smaller cities so that industry would spread more evenly across the country was the hoped-for policy of both Jawaharlal Nehru and Indira Gandhi, but industries still sprout like mushrooms around the four main cities of the country. So the town-planning nightmares enlarged upon by Aiyar are more or less inevitable and, as he also points out clearly and rightly, we have to accept the facts of life and plan for the best we can do for the apparently inevitable urban jungle.

The urban housing shortage (dwelling units) are about 5.2 million with a five-yearly increase of over two million, and to meet these housing

needs in the next ten years we will spend about 44,000 crores of rupees. (Perhaps this figure makes a little more impact if we write it down in full—Rs 44,000,00,00,000!) I want to add to these horrific figures by reminding us that the rural population is three times greater than the urban one. The fact that there is a steady migration of rural people to the cities does not mean that they leave behind them lakhs of empty 'desirable residences'! Numerically, if not spectacularly, we have more rural slums than urban ones. To the starry-eyed, rural slums may have a more romantic air about them because of cows, goats, hens and banyan trees—but the services are considerably less and the rate of increase of population is greater.

These figures clearly show that the task of coping with this enormous need for housing is not a little side issue to the other and main work of the Public Works Department(PWD). I believe that the very fact that we can even contemplate spending a figure like Rs 44,000 crores, should mean that we need an establishment whose sole aim is to cope with this vast task of giving the economically weaker section of seven million families houses, however small, to live in during the coming Five Year Plan period. Our PWDs have a-hundred-and-one-tasks to cope with—dams, docks, bridges, roads, public buildings of all sorts, all requiring engineering skills. Almost all our housing boards show a marked preference for building for the high- and middle-income groups. They also prefer to hand over loans and grants for others to deal with the actual construction work of putting up low income group and EWS housing. Furthermore, they are autonomous bodies whose board members are mainly political nominees who decide on their own policies of what they will build and for whom they will build and at what cost they will build.

Is it not high time, therefore, that a body is created with nothing, absolutely nothing but this one single goal of providing seven million basic houses in the next five years?

What would be the shape of such a body with a chance of accomplishing even half of the seven million goal? Don't forget that very very few housing boards or other institutions or departments dealing with housing manage to put up LIG and EWS houses in thousands a year, let alone lakhs. The typical housing board staff is dominated by a very large group of highly-trained and qualified engineers, aided by a few ar-

chitects and a few administrators and clerical staff who are at their diposal. Whenever I am designing or building small 200 square feet houses costing Rs 4,000–5,000 each, I always wonder where these excellent, experienced, highly and expensively trained engineers and architects fit into the picture.

Engineers are not a necessary part of the permanent staff of the body we need actually to construct a few million houses. The same goes for architects. We are not going to require seven million individual plans and designs! At the most there will be fifty (more likely it will boil down to five) variations of one or two basic plans to cope with varying regional and climatic requirements. Town-planners. Yes, *if* they will promise to always keep in mind this one simple single goal of seven million EWS houses all over the country in accessible places and on very limited land.

What we will need most are down-to-earth (rather literally in this case) top quality adminstrators of the civil service type. They will have to see to the location and acquisition and distribution of land. They will have to organize the continuous availability, in very large quantities, of simple local building materials and local transport to get them to the building sites. They will have the organizing of workshops for producing a large and steady flow of the simplest doors and windows, etc. They have to organize the daily availability of cash to pay for labour and materials on the spot. All this contracting nonsense and only-being-paid-when-work-has-been-done-to-a-certain-level will not work when we are to involve ordinary people and labourers and craftsmen in a tremendous labour-intensive job.

These tasks must be seen as simple, direct, straightforward ones. Nothing complex must be allowed to creep in. This is a vast industry with very very few ingredients and only one simple goal. Quick decisive administration and organization is what is called for in a big way. It must be seen as a small, efficient, well-oiled hub in the middle of a large wheel rim that has to revolve steadily, without ceasing, seven million revolutions. For the seven million families awaiting a proper, however small, roof over their heads it will really be a revolution! Certainly up till now none of our many existing building construction bodies has shown itself capable of producing one-thousandth of what we are hoping for.

There are apprehensions expressed about our Five Year plans—and it is all too easy to be critical—but it does seem to be true that much of

the planning is in the form of an effort to improve on the performance of the previous plan programmes. Housing has always had a prominent part in all these plans, but we always fall far short of our targets. All the plan housing proposals expect the programmes to be achieved through the existing machinery and establishments, and if one thing is clear it is that all these agencies achieve a pitifully small proportion of what is hoped for.

Let us therefore leave the PWD type of establishments to deal with the many genuine engineering needs of the country (and there is certainly no dearth of such needs and no question of 'chopping' engineers!). But let us plan realistically for this one simple, single goal of say five million houses in the next five years, and let us use only such people who are absolutely necessary for the carrying out of such a plan.

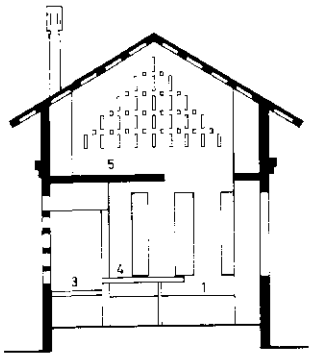
No one these days even attempts to refute the allegations that an enormous amount of building money is siphoned off into ever increasing number of pockets. Whole establishment systems are now attuned and geared to this siphonage and all seem to accept it as inevitable. If we attempt this EWS housing plan by 'the direct method' we have a chance to show that siphonage is not an essential ingredient of India's management system.

I don't want to challenge some of Aiyar's ideas about what these five million homes are going to look like! His facts and figures make me shudder in concern and shame. His dreams of 'high and straight' buildings make me shudder in horror! Nature only goes in for proportionate height and very rarely for 'straight'. One of the areas where we waste an enormous amount of building money is in fighting nature, when we should be conserving money and materials and energy by going along with it. However, the designing of seven million houses should be no problem to India's architects and there is no reason why small should be ugly. The bigger problem is how to get these seven million houses up before 1990.

Indian Express
December 1984

Proposal for a Core House

While travelling in rural India one realizes that an enormous number of people have made their own 'shelters'. We tend to call them 'huts' 'hovels', not 'houses'—they have the basic protection of some walls and a roof, but little else. There is often no water supply or sanitation, and cooking is done outside. It is not that these amenities are not required, but just that a fair amount of money has to be spent on them. Mud and thatch, on the other hand, merely require a bit of skill and manual labour.



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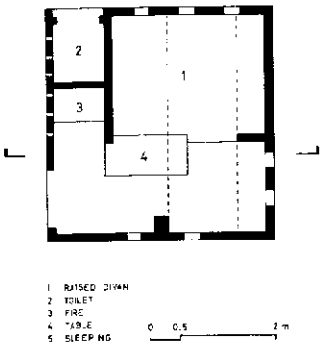


If and when the government or other agencies want to build for such families, it would be far more sensible to provide essentials like a water supply and a latrine, rather than a structure which they can normally build themselves.

Obviously with time factor, weather, seasonal occupation and so on we cannot just dump these facilities on an empty site and tell the occupant to build a house round them. So we should provide the absolute minimum of a house—a minimum that will include the essentials of fire, water and waste disposal.

I think it is better to build a small tower, so that the minimum building is high enough to accommodate a built-in sleeping platform and a work table at the ground level, and a naturally-vented loft space. A small segregated cooking area and a separate toilet can also be part of the same core volume. Later, if and when funds are available, people should be able to acquire other 'building units' when their occupations give them the opportunity for constructing their own walls, doors, windows, roofs, etc. They can also build a perimeter wall with other facilities attached, with lean-to roofs, sheds, stores, animal and work areas, covered spaces within their own secure bit of land.

(*unpublished*)

APPENDICES

Appendix 1

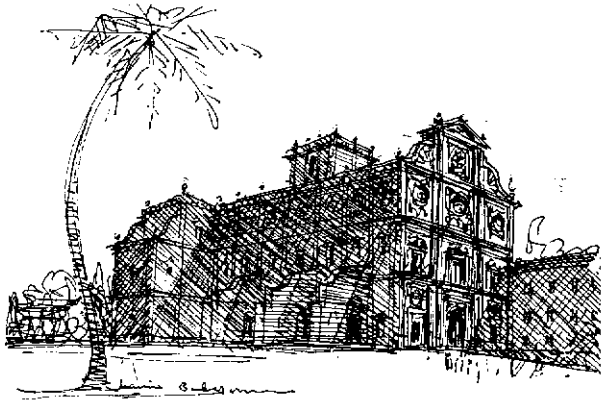
Introduction to Laurie Baker's Drawings and Sketches

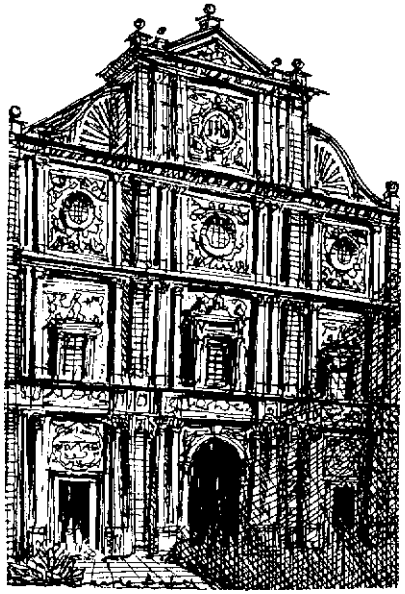
The designing and making of a building is the result of numerous influences and assimilations, but the nature of these influences can be gauged only by the way they are perceived and recorded by the architect. The research and survey of a place and its people for projects, has held an endless fascination for Baker. The settings for living created by him and the desire for personalized detail comes from the architect's own compulsion to make a meticulous documentation of the places he visits and inhabits.

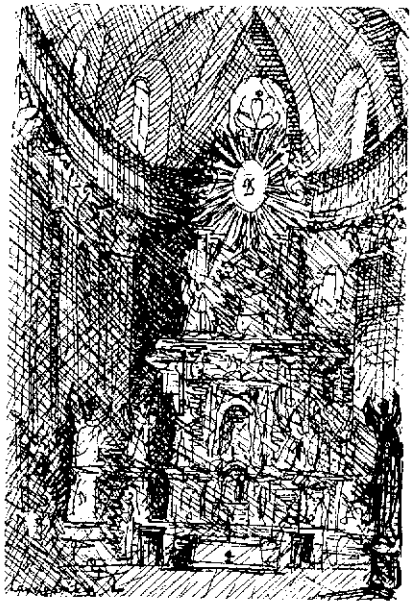
Baker keeps a diligently prepared notebook on the hospital he has visited, the village he has designed in, and also the ordinary people he meets every day. His comments on institutions of the government (the roads of Kerala) and on cultural and private idiosyncrasies (the tying of the *mundu*), suggest an artistic ability to record a place with objective faultlessness, as well as offer subjective home truths.

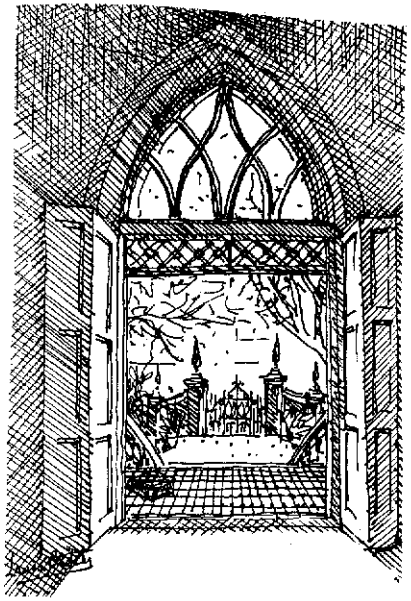
Baker's perception of design and his interpretation of life are illustrated here in his documentation of two places which he had visited: the first is a set of sketches of a church in Goa; and the second is a documentation of a village in Andhra Pradesh for which he was asked professional help on developing designs for cyclone shelters.

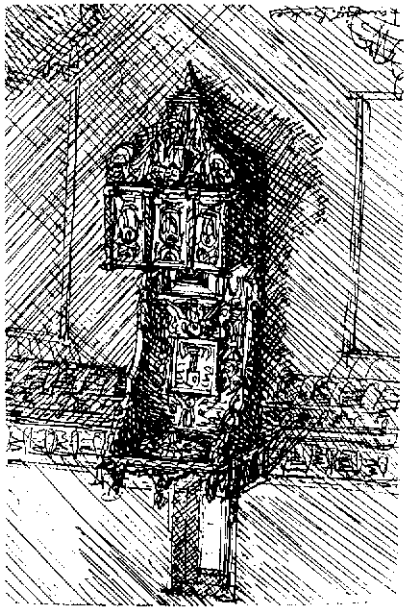
Details of a Church in Goa

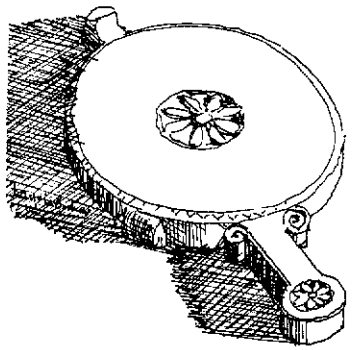








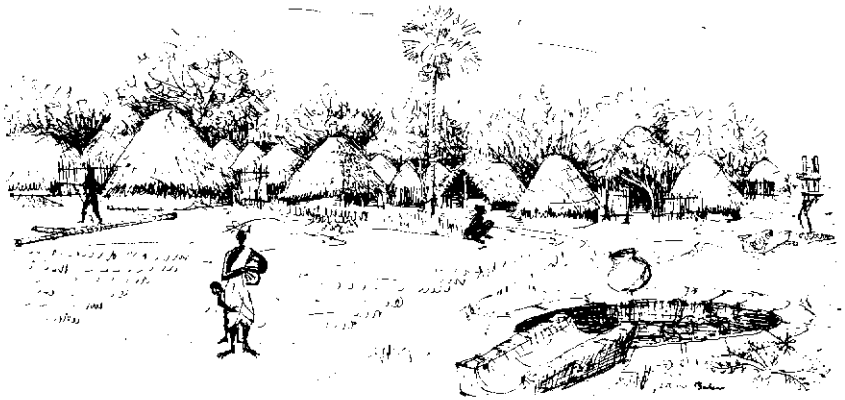




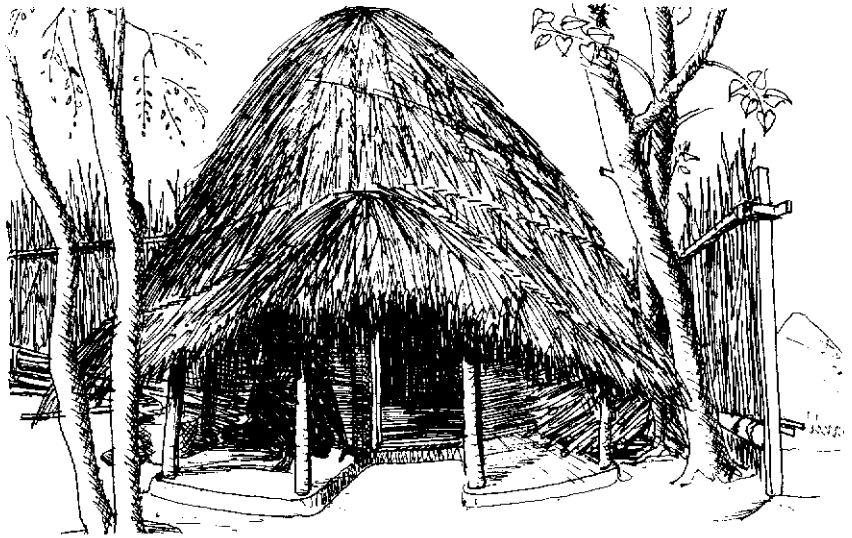
Details of Ramapuram (Kuppam) in Andhra

view west to next village: away from the lake and looking towards the distant hills

fishing village, 55 kms north of Madras—fishing in the Pulikat lake



a fisherman's house



Small conical mud and thatch houses.

Floors: either beaten mud leeped with thin cow-dung, or mud and lime plaster beaten very smooth and shiney.

Walls: no foundations. Walls of mud, nothing extra added. The men do the work. 3 ft. to 4–6 ft. high.

Supports (for small veranda): mainly rough straight timber about 3–4 ft. high and 4–5 in. diameter.

Roof frame: rafters rough, of bamboo, split palm trunks, or rough timber, max. size about 3 in. x 2 in., often-much smaller. These are tied onto hoops of cane to form a cone which sits on the mud wall. (Sometimes small wooden 'anchors' are bedded in the mud.)

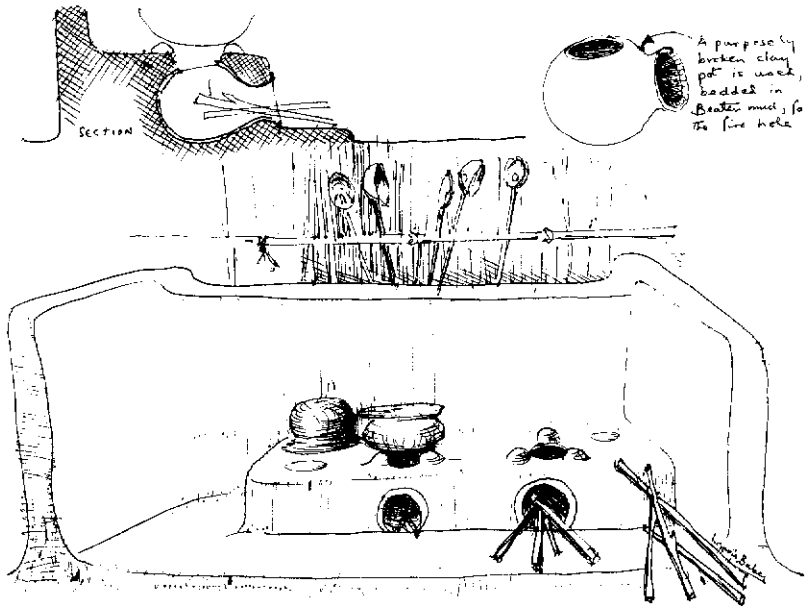
no *Windows*

Doors: mainly 3 planks (each 5 ft. 6 in. × 1 ft. × 1 in.) nailed with big iron spikes on to 3 battens (horizontal wooden frame of about 3 in. x 4 in. timber).

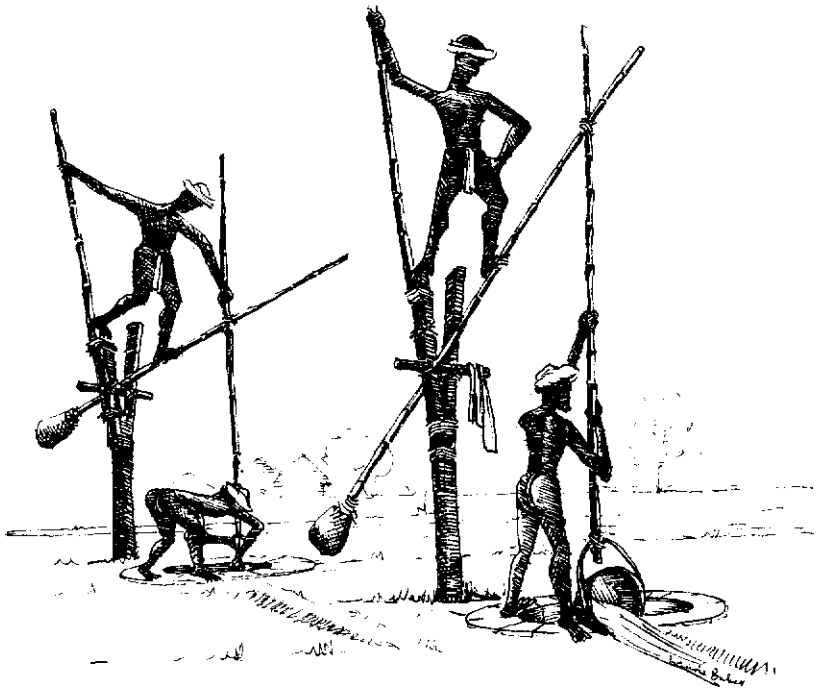
Roofing: coconut or palmyra leaves tied on the rafters—then rice straw thatch on top—all held down with an inch thick rice straw ropes.

most *Plans:* are circular. Very few roughly square. One or two, only, rectangular.

the out-of-doors cooking place in the open yard



drawing water from wells



Appendix 2

Laurie Baker's Cost-Reduction Manual

In 1972, Achuta Menon, the then Chief Minister of Kerala, realized the potential of Baker's work. And so he sought to use Baker's ideas for streamlining the numerous housing programmes of the state. These were incorporated in a handy guide for laymen in a simple step-by-step fashion. The manual was published by the Centre of Science and Technology for Rural Development (COSTFORD).

As Menon said about the manual, 'I wanted it written so that even I, as a Minister, would be able to understand it. It was meant to be a manual for Kerala, translated into Malayalam and provided to every local building office and district headquarters.'

Virtually all practical samples of building and cost-reduction that were found in similar manuals by other government organizations had already been demonstrated in Baker's work—so putting it together was simple. A garbled, cliché-ridden copy had been prepared by engineers of the Public Works Department (PWD), which was later re-worded by Baker into a simple text with line illustrations.

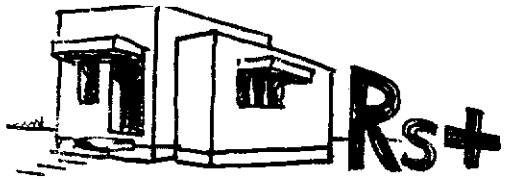
Copies of the manual, published in English and Malayalam, were sent to district collectors, tehsildars and panchayats. 'Occasionally,' says Baker, 'a good man will be transferred out to some remote tribal area—as all good men often are—there he'll produce the book and say "I want a core house built just as in the book?" But such instances are rare....'

The manual gives a logical analysis of how the design, production and assembly of different components of a building—walls, foundations, roofs and windows—can be simplified, and, in the wasteful, budget-conscious programmes of government housing, made more cost-conscious. Even today, nearly twenty years after its publication, this humble work carries a range of common-sense ideas that are equally relevant today.

Some excerpts from the manual are given in this appendix.

Houses: How to Reduce Building Costs

Building houses is a costly business these days. A lot of the current expenditure is on unnecessary fashionable frills and designs. Much money could be saved merely by using common sense, along with simple, established, tried building practices. Every item that goes to make up a building has its cost. So always ask yourself the question: is it necessary? If the answer is 'no', then don't do it! The following pages attempt to show graphically the current and often expensive ways of doing things, compared with the simplest, less-expensive ways of building. The saving on each individual item may be small, but if you can cut down every rupee's worth of the current cost by twenty-five paise, a ten-thousand rupee house can be built for Rs 7,500. In saving and cutting down costs, the coice is *yours*. Do not allow the architect, the engineer, the building contractor to be dictators. You tell them what you want!



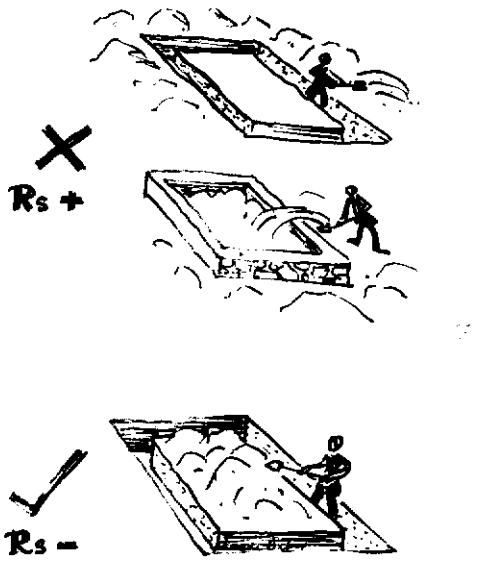
You often hear people describing houses as 'modern' or 'old-fashioned'. The so-called modern house is often merely fashionable but foolish, simply because it is expensive and does not take into account the locally-available inexpensive materials or the local climatic conditions or the actual needs of the occupants. Quite often the so-called 'old-fashioned' house demonstrates that the choice of building materials is important because it is less expensive and does not use up unnecessarily, materials that are in short supply and needed for other uses. It

also copes effectively with weather hazards, such as strong sun, heavy rain, strong winds, high humidity, etc.

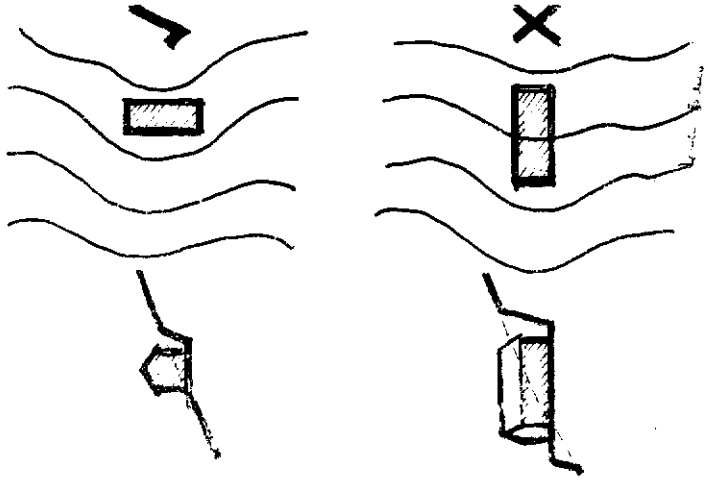
The two sketches typify the small 'modern house' at the top and an old-fashioned one below. The modern house is 'cubist' in design and uses a lot of cement plaster and paint. The roof does not protect the walls from rain and sun with the result that it is not very comfortable or convenient to live in. The 'old-fashioned' house has a sloping roof which quickly sheds heavy rain, protects walls from getting damp and from absorbing heat from the sun. Some of the windows have been replaced with *jalis*, which are cheaper and give permanent ventilation and light and protection or security.

If you have to build your house on a terraced site, it is less expensive to place it in the middle of the terrace.

The lower picture shows the extra and more costly foundation and basement wall that has to be built if the building is near the edge of the terrace.

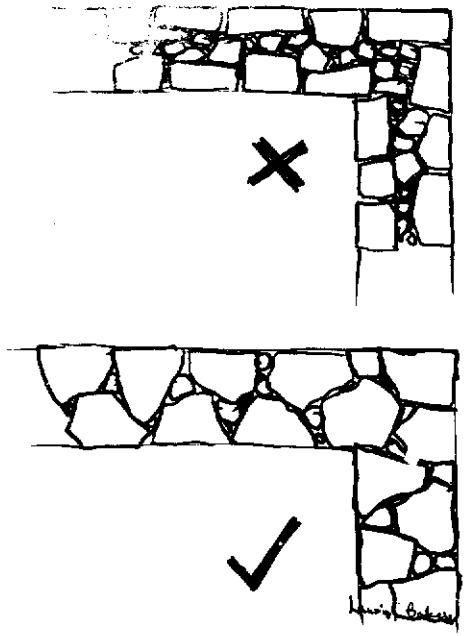


If the site is a sloping one, less excavation and less filling up is needed if you place the building parallel to the contours, as in the upper picture, and not cutting across the contours, as shown in the picture above.



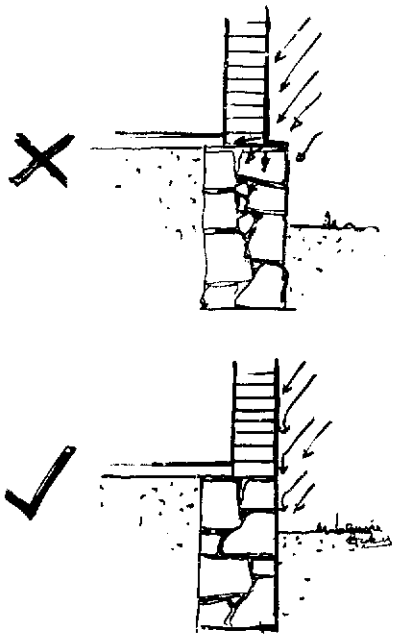
When excavating the trenches for the houses' foundations, labourers dig out the soil and throw it in all directions, especially outwards. After the basement walls have been completed they then shovel all the soil

back again as infilling. If they shovel the soil inwards it will already be where it is wanted for infilling and some of the expense of excavation and infilling will have been saved.



Masons are often more concerned with the outward appearance of a stone wall than with its strength and stability. The upper sketch shows a plan of a stone wall as it is usually built, with big, flat-faced stones on the outside while the middle of the wall is filled in with bits and pieces.

The lower plan shows how stones should be bonded, that is they dovetail in with stones on the other side of the wall and therefore give a much stronger and more durable wall. A properly bonded stone wall hardly needs mortar, and certainly a mud mortar is adequate, whereas the upper typical wall is not really safe without using a cement or lime mortar.

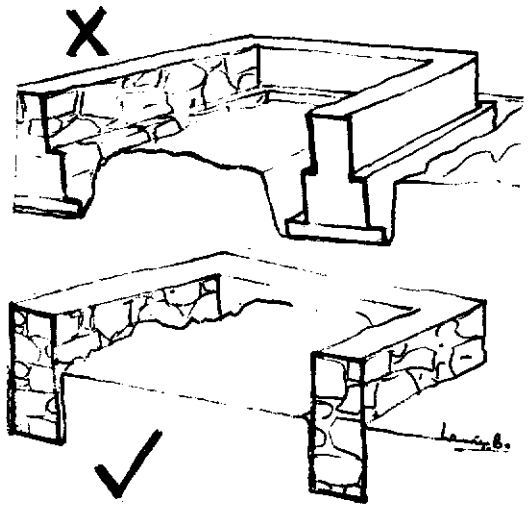


A common practice is to have the main walls of a house in nine-inch thick burnt bricks, sitting on top of an eighteen-inch random rubble (roughly-shaped stones) for the basement and foundation.

This means that there is a step where the nine-inch wall sits on the eighteen-inch wall below, and rain-water tends to seep in and weaken the lower stone wall, as shown in the upper picture.

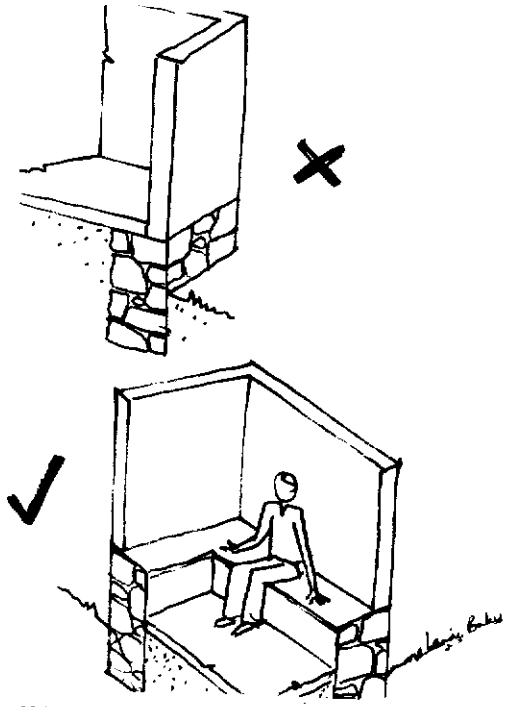
For single and double storey houses it is better to put the outer side of nine-inch brick wall flush with the outer side of the eighteen-inch stone wall so that rain-water running down the wall does not soak into the wall.

This is also less costly because the eighteen-inch stone wall surrounding a room of a particular area (say 200 square feet) is larger (cubic content more) in the upper drawing.



After building a house there is often little cash left over for furniture.

Built-in seats, beds, work tables, etc. can easily and inexpensively be had, merely by building the basement wall to a suitable height as shown in the lower sketch.



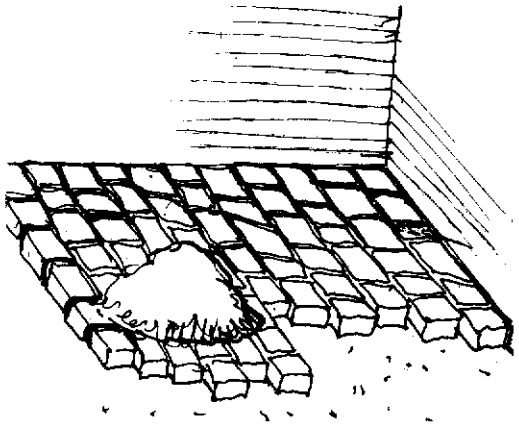
(see text on page 284)

(see illustration at the bottom of page 283)

The object or function of the foundation is to spread out the total weight of the house over the ground below it.

For small single and double storey houses on eighteen-inch (45 cm) wide foundation base is usually fully adequate on most soils and there is not often the need for the wider concrete layer beneath the basement wall (as shown in the upper picture).

Where stone is available, the ordinary simple eighteen-inch thick random rubble wall is perfectly adequate to carry the full load of a single or double storey house, unless the soil is very poor or loose or of different consistencies.



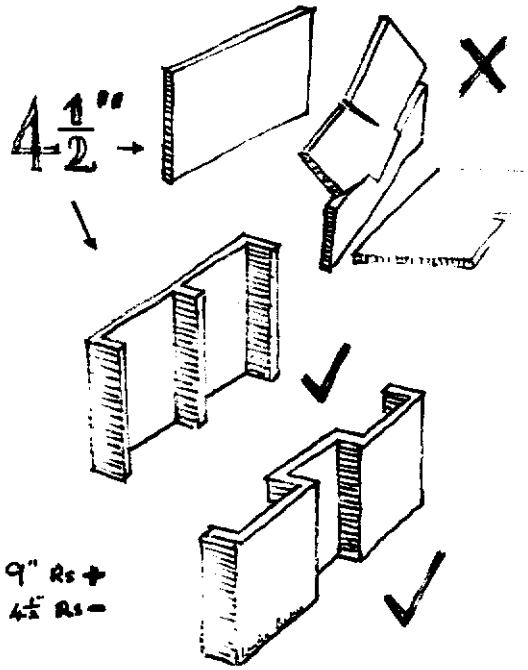
Almost every sort of floor has to have a solid base under it.

Fill the basement with sand or soil at an early stage and it will get trampled down solid as work is done above it.

After the roof is on, collect all the broken brick bats and lay them side by side, touching each other, on the rammed earth.

Mix a small heap of sand and lime on top of the bricks, and then spread it out and brush it in so that it fills all the cracks.

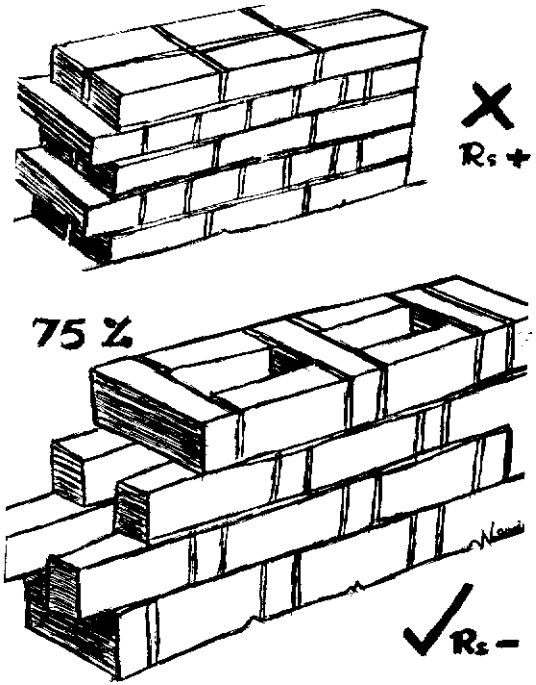
On top of this base any type of flooring finish can be laid successfully.



From a structural stability point of view, a four-and-a-half inch thick brick wall is often adequate for small single-storey houses, and certainly for interior partition walls. An isolated straight four-and-a-half inch thick wall is weak and can either fall over, or be knocked over, or can be crushed by the weight of the roof it carries. But it can be perfectly strong and capable of carrying the load of roofs and floors if it has either thin buttresses every five or six feet (as in the middle picture) or if recesses are created (as in the lower picture).

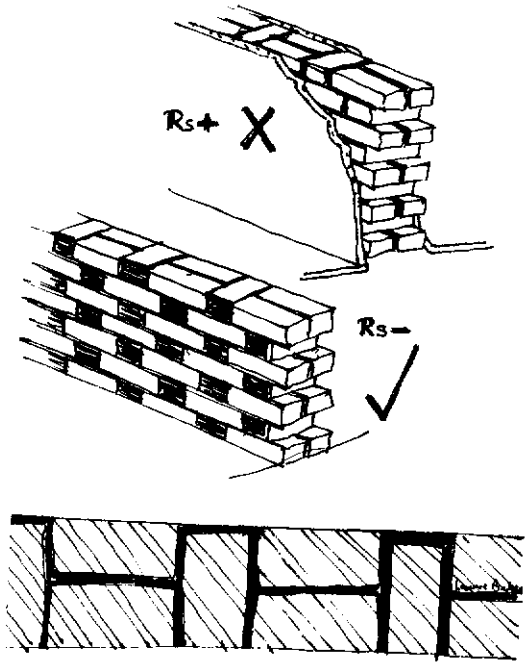
Similarly corners and intersecting walls are strengthening points in a thin wall.

These recesses can be used for shelves and *almirahs* at almost no extra cost!



If burnt-brick is available, and if a nine-inch thick wall is required, then twenty-five per cent of the total number of bricks, and of the cost of the wall, can be saved by using a 'rat-trap' bond. It is simple to build, looks well, has better insulation properties and is as strong as the ordinary solid nine-inch thick brick wall.

The orthodox English bond is shown at the top, and the rat-trap bond below.



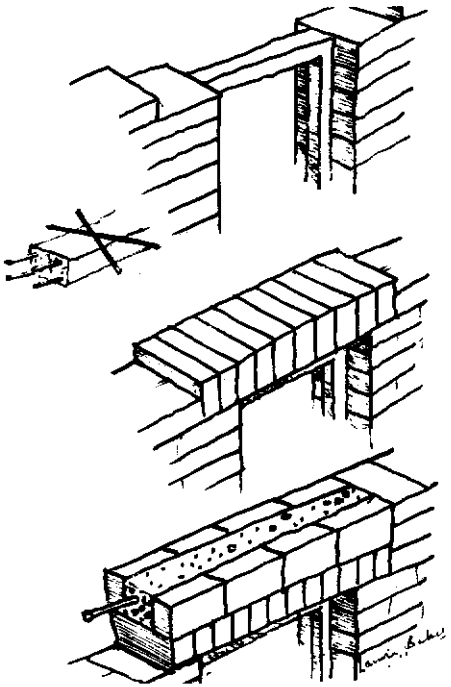
Bricks are often slightly irregular in length. So even if you can get a smooth 'fair face' on one side of a wall, the other side will be lumpy and irregular. Therefore, many builders say you must plaster the wall. But plaster is costly (it accounts for up to ten per cent of the total cost of a building). Also, there are the painting and maintenance costs of plaster to be considered.

The middle sketch and the lower plan show how the mortar can fill over the sunken end of the brick to produce a special fair face on the second side of the wall. Plaster is not required and a pleasing pattern has been made. Besides it has no painting and maintenance costs.

	Cement	Lime	Surki	Sand
Rich mix Rs+	1	—	—	6
General Rs-	1	—	—	8
For stone for basement Rs=	1	—	—	10
Rich mix Rs+	—	1	—	2
General Rs-	—	1	—	3
Rich mix Rs+	—	1	2	4
General Rs-	—	1	2	6
Rich mix Rs+	1	3	—	12
General Rs-	1	4	—	14
For stone for basement Rs=	1	5	—	16
Rich mix Rs+	1	2	4	18
General Rs-	1	2	4	20

This chart shows a variety of the mixes of cement, sand, lime and *surkhi* (finely-ground burnt clay) to give different plasters and mortars according to the function for which they are needed and according to the cost and availability of these several ingredients.

At present cement and sand only are commonly used. This is easy to mix and use, and it sets quickly. Lime and sand can give an equally strong mortar but it takes longer to set, and lime mortars have mainly gone 'out of fashion'. Similarly, good strong mortars are made by adding *surkhi* to lime and sand. These too are slow setting and 'unfashionable'. The slow setting problem can be solved by adding to the lime, or lime and *surkhi* mixes, a small amount of cement. All these variations are in this table.



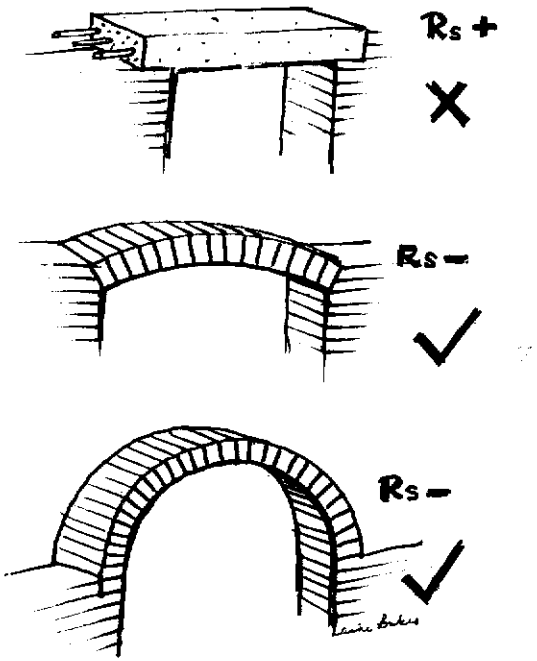
Lintels are usually made of reinforced concrete. Steel and cement are used.

Very often a lintel is not necessary over door and window openings up to four feet in width.

Ordinary brick-on-edge, as shown in the middle picture, is all that is required.

If something stronger is necessary, a hollow arrangement of bricks-on-edge, as in the lower picture, filled with one or two steel rods in concrete will carry very large weights of wall and roof etc. above.

This type of lintel is less than half the cost of the orthodox reinforced concrete lintel.



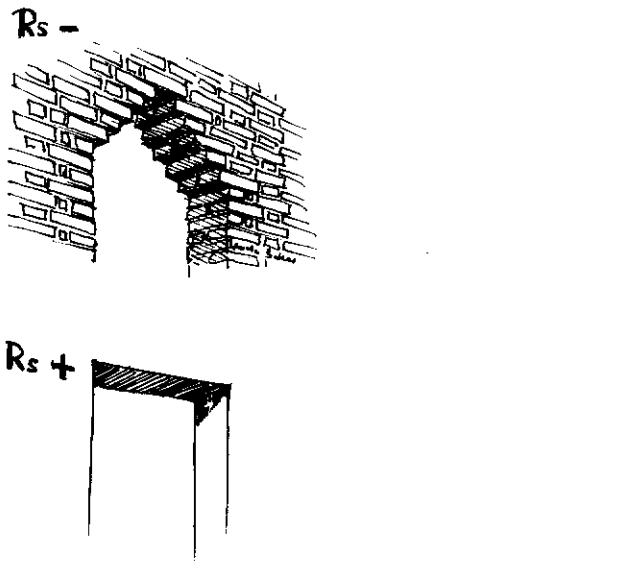
Almost every sort of floor has to have a solid base under it.

Fill the basement with sand or soil at an early stage and it will get trampled down solid as work is done above it.

After the roof is on, collect all the broken brick bats and lay them side by side, touching each other, on the rammed earth.

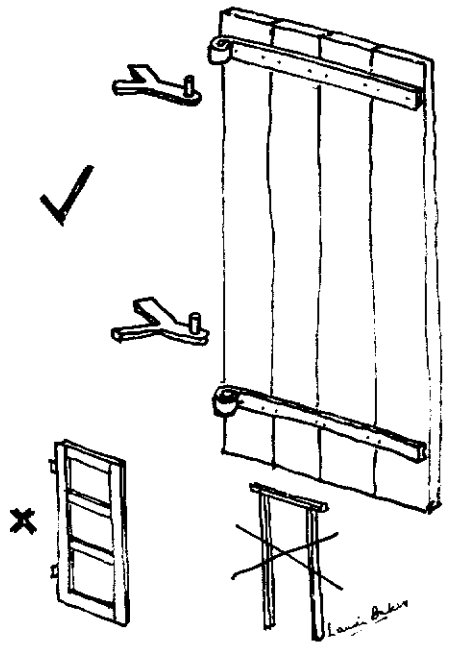
Mix a small heap of sand and lime on top of the bricks and then spread it out and brush it in so that it fills all the cracks.

On top of this base any type of flooring finish can be laid successfully.



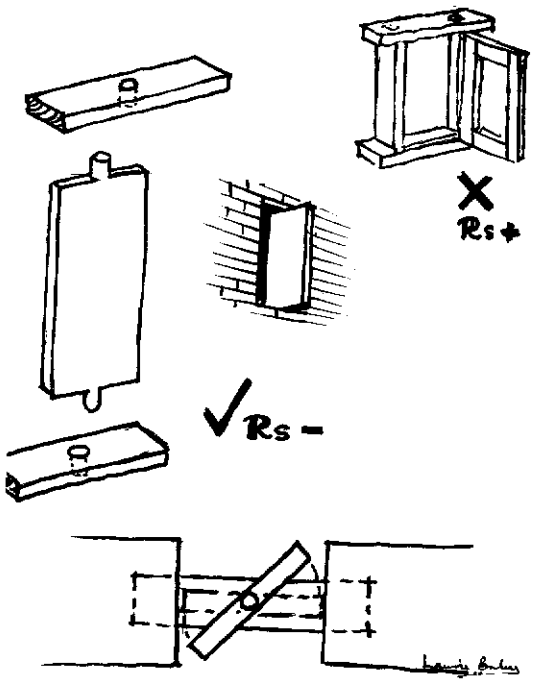
The most inexpensive way of spanning a hole in a wall is the simple 'corbel' arch. Each row of bricks projects two-and-a- quarter-inch beyond the course below until the bricks meet together in the middle. No formwork or shuttering is necessary.

This picture also demonstrates the fact that if you remove a door or a window, the whole wall will not fall down! Probably nothing will fall at all, but if it does, the maximum will be the amount of wall within the triangle above the frame. This triangle of bricks is, in fact, all that a lintel carries, and not the whole wall and half the roof above it.



Door frames cost a lot of money and are often not actually necessary.

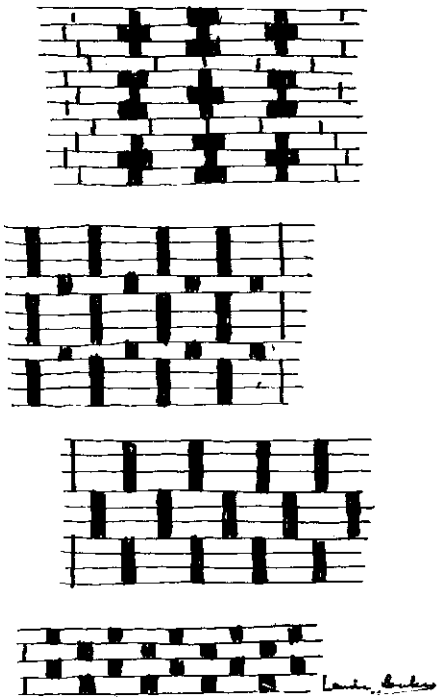
This picture shows how planks can be screwed together by strap iron hinges to form a door, and this carried by 'hold-fasts' built into the wall, thus eliminating the outer door frame altogether.



When a window is a necessity it is quite a costly item as shown in the top right hand corner.

The simplest window consists of a vertical plank set into two holes (or pivot hinges), one at the top and one at the bottom. The traditional design consists of two short wood pieces with a circular hole in each, and the vertical shutter has two small round protrusions (as shown on the left) to fit into the holes. Only a nine-inch wide hole is necessary for the 'window'.

This is strong, simple, inexpensive, requires very little labour, no iron mongery, lets in light and air and provides security.

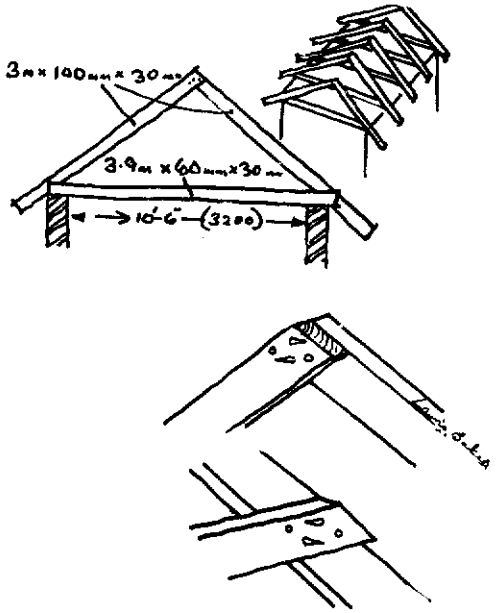


Windows are costly. One square foot of window can cost up to ten times the cost of the simple brick or stone wall it replaces.

A window has varied functions: to look out of, to let light inside a room, to let in fresh air, to let out stale air, and so on. In many of these situations a *jali* or 'honey-combed' wall is just as effective. Far from being a lot more costly than the basic wall, if made of brick it can be less costly than the house wall.

The bottom picture shows the simple honey-comb brick pattern. Wide vertical joints are left open and not filled with mortar.

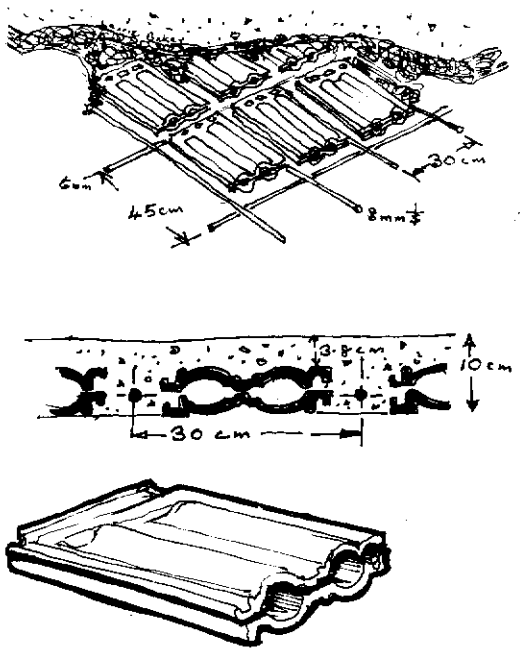
The pictures above show a few of the many possible variations. This is an excellent inexpensive alternative to the costly window.



Anyone who can use a saw and a hammer can put together a simple, strong roof of timber over rooms up to twelve feet (3.65 m) wide. Three pieces of wood are nailed together and this simple 'trussed rafter' sits directly on top of any wall.

No wall plates and no ridge poles are necessary.

The traditional timber roofs are beautiful, but often quite elaborate and extravagant with the use of wood and call for a lot of skill.



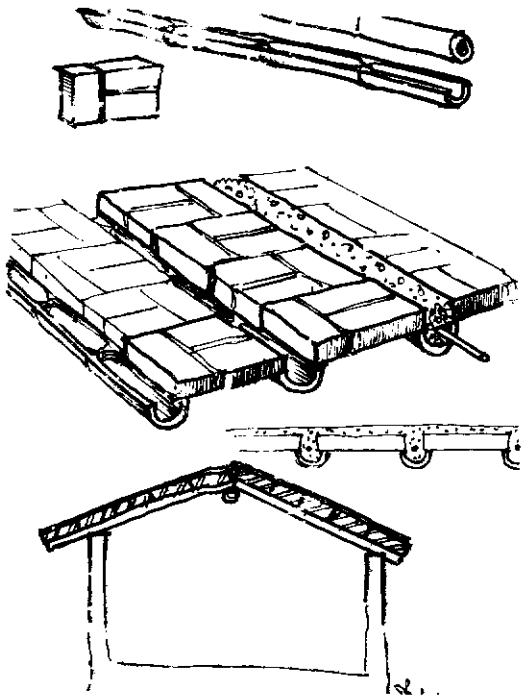
Timber is becoming too scarce and costly.

Galvanized iron and asbestos cement sheets use less timber, but iron rusts and is very hot to live under while those who work in asbestos factories and who live and work under AC roofs tend to develop lung cancer, so we should discourage its use and manufacture. Reinforced cement concrete slabs are very costly and use a lot of iron and cement.

As there is quite a lot of unnecessary concrete in an orthodox RCC slab we can replace some of this redundant concrete with any light-weight, cheap material in order to reduce the overall cost of the slab. This alternative RCC roof is called a filler slab. For fillers we can use light-weight bricks, or Mangalore or country tiles, or hourdies etc. This will reduce the cost of the orthodox RCC slab by about thirty or thirty-five per cent. As roofs and intermediate floors account for twenty

to twenty-five per cent of the total cost of a house, the saving by using a filler slab is considerable.

The top picture shows how two waste Mangalore tiles come together to form an excellent light-weight filler, and how they are placed between the steel reinforcement rods creating a grid of RCC or beams. The lower picture shows a section through the slab.



A good mature bamboo can also be split in half and used as a permanent shuttering for reinforced cement concrete ribs between brick units (three burnt bricks previously joined together with mortar to form a small slab).

This is a rural version of orthodox reinforced brick slab (RBC).

System of Establishment Charges in 1986

The following examples are percentages currently used by the Kerala State Housing Board.

Rs 8000 is spent on land and house for an Economically Weaker Section (EWS) family.
Approximately, of this sum:
Rs 2500 is spent on land
and Rs 5500 on the house.

The Housing Board charges	
for its overheads 12.5%	= Rs 690
for electricity, water and sanitation 15%	= Rs 725
for contractors profit 10%	= Rs 550
for storage fees (cement and steel etc.) 8%	= Rs 160
So the total for these fees and charges etc. is	Rs 2125
which leaves for materials and labour etc.	Rs 3375
So only 42% is used on actual building out of	Rs 8000

To take an actual instance of what this means:

There is a proposal to construct houses for cashew workers

4000 houses at Rs 5000(or 5000 at Rs 4000?)	= Rs 2,00,00,000 (2 crores)
12.5% for establishment charges	= Rs 25,00,000 (25 lakhs)
Contractors rake off 10%	= Rs 20,00,000 (20 lakhs)
Storage charges 8% on one-third	= Rs 5,00,000 (5 lakhs)
Total for these charges	= Rs 50,00,000 (50 lakhs)

I consider a lavish arrangement for an 'Establishment' to deal with the building of these few thousand houses could be as follows:

1 Director say	Rs 25,000
10 Supervisors say	Rs 120,000
1 Architect say	Rs 10,000
Office expenses say	Rs 10,000(!)
Travel say	Rs 15,000
etc. say	Rs 20,000
Total	Rs 2,00,000

but the Housing Board would get Rs 50,00,000 for designing one small house.

Now consider the needs of the country. Let us say there will be a million houses put up all over the country during 1976.

This will cost (at the Rs 8000 per house figure)	800 crores
Of this land will cost	200 crores
and buildings will cost	600 crores

The establishment charges for the average State Housing Boards would be 12.5% (the highest allowed by the Act) + 75 crores.
This for designing one small house plan with, say, ten different variations to suit differing conditions throughout the land.

Contractors profits @ 10% come to	Rs 60 crores
and 'storage charges' to	Rs 16 crores
So charges alone account for	151 crores!

Suggest an 'Establishment' to deal with a country-wide million houses scheme in a year (half-a-lakh per state approximately)

1. Chairperson/Director	Rs 50,000
2. A committee of experts, say 20, to meet 5 times, at Rs 5,000 per member per time	Rs 5,00,000
3. 100 administrators or engineers or organisers at Rs 25000 each	Rs 25,00,000
4. 1000 juniors as supervisor-cum-work-organizer-and-buyer each at Rs 1000	Rs 1,20,00,000
5. Office rents	Rs 9,50,000
6. Printing and office work etc.	Rs 15,00,000
7. Travel etc.	Rs 18,00,000
Total	Rs 2,00,00,000 (2 crores)

Multiply by 10 for the benefit of sceptics	Rs 20 crores
But Housing Boards would have taken	Rs 151 crores!

To me this clearly indicates that such 'low-cost schemes' should be separated and dealt with by their own small 'Establishment'.

Appendix 3

A Letter to the Minister for Works and Housing

Laurie Baker
The Hamlet
Nalanchira
Trivandrum

To the Minister for
Works and Housing
Kerala State Government

10 April 1984

Dear Sir,

I do hope you will pardon my writing to you like this but I feel more and more uncomfortable about our government's approach to the housing needs of the state, not to mention our construction output.

You are of course aware that I am not an Indian citizen but I have made India my home for the past nearly forty years and throughout that time I have been building with and for ordinary people, with whom I totally associate myself. As your Housing Commissioner often reminds me, I do not understand the way our government departments work (and I am sure I am not the only person worthy of such an assertion). But I have been quite closely associated and involved with such bodies as HUDCO, CBRI, UPDESCO, NID and the Planning Commission and Planning Board groups etc. so I feel I have these as a mild excuse for writing to you with a little bit of understanding of the housing needs of us all.

I put it that way because almost everyone with whom I talk about housing express their feelings that we, the government housing organizations do not apparently understand the actual housing needs of

ordinary people, and even if there is any understanding there seems to be precious little being done actually to meet those needs.

I have to make it very very clear that when I use the words 'ordinary people' I do not mean myself and the friends I have from the same social stratum. Taking census data, this 'ordinary' or 'average' person is rural, is not permanently employed, has next to no savings, and does not use a bank.

This letter is to plead with you to try and help change the attitudes, policies and performance of the Kerala State Housing Board (KSHB). I sincerely hope that you read through carefully the two letters about the Housing Board in today's *Express* page 3, because they are very very typical of how people see the Housing Board. The figures they quote are correct. This does mean that this sort of Housing Board Construction is costing Rs 400 per sq. ft. It does mean that the Housing Board thinks that a Middle Income Group (MIG) man can put down an advance payment of Rs 1.16 lakhs and can pay instalments of Rs 4,600 and pay 15 per cent interest too.

Instead of listening to these very valid criticisms by the people of Kerala, the Board tries only to justify itself and belligerently declares it is quite justified in building for the rich. To make this really clear its three senior officers go gadding off to the Gulf to see what they can do for all those poor Keralites who are slaving away in order to send us some foreign exchange—if the KSHB does not do something for them, everyone else will get houses and when they return they will have nothing. Our hearts really bleed for them.

Meanwhile the Board puts out its figures of building for the poor. There is your Voluntary Agencies Scheme. From time to time announcements about it are made in the press, but the fact remains that the lay people involved (i.e., these Voluntary Agencies) have no organization or personnel who know how to build large numbers of houses and they are all left with the problem of how to get the houses actually constructed. I know this to be a fact because they come to me asking me to build the houses for them.

Then there is the continual criticism by all that the KSHB is only concerned with High Income Group (HIG) and MIG housing. Again the Board tries to say that this is not true and that it has built for Economically Weaker Section (EWS) and Low Income Group (LIG).

But again, the actual fact is that the numbers of houses actually built by the Board are very few for both rich and poor—the actual figures of houses actually constructed by the KSHB in the past few years were: 1979–80, 525 houses, in 1980–91, 440 houses, in 1981–82, 404 houses, and in 1982–83, 165 houses; and of these four years production of a total of 1,567 houses, only 165 of them were for EWS. Of course, I am instantly jumped on when I quote these numbers and am told the Board has given so many sites and so many loans. But, Sir, I am concerned with actual numbers of houses produced and being lived in. You don't live on a vacant site and you do not live under a loan. I personally think that these figures, considering the number of highly qualified staff and considering a weekly wages bill of seven lakhs, and considering the clamourings of the people for tens if not hundreds of thousands of houses, are nothing but disgraceful. You should know that it is the considered opinion of a very large number of seriously thinking people that at present there is very very little to justify the continued existence of the Housing Board.

Another point to look at seriously is the fact that you organized the housing competition and the Board showed that it could build for Rs 6,000, but it now refuses to get down to it and build half-a-lakh or so, and instead it has just put up EWS houses costing well over twenty thousand rupees and sanctimoniously advises the Voluntary Agencies to get on with their building schemes and the Housing Board will give them plans and technical advice!!! Very hearty laughter, if it were not so pathetic.

If we are to build the houses the people of the state need, we have to go about it in a very different manner from what is currently being done, or not being done, as the case may be. It is agreed by most that to every one HIG house needed, there are three MIG houses needed and well over thirty LIG and EWS houses. It is generally now agreed that if we (including your Housing Commissioner) are to meet the housing needs of the state by the end of this century we need to build nearly one lakh of houses every year. Quite a lot—perhaps half(?)—may get built by ordinary people themselves—but the other half—probably about 45,000 EWS and LIG a year—will have to be put up by some government organization each year. So far, no government agency and no voluntary agency has shown itself capable of dealing with such numbers.

But it is very clear that there is a real and crying need for some such agency which is staffed only by personnel trained and fit and willing to build very simply and systematically, Engineers and Architects are not required, nothing either of them can do is built for four, five or six thousand rupees. You need a first class senior IAS man to head the organization and he should have powers and staff to acquire land, amass local building materials where needed (this means mud, laterite, granite, lime, etc.—not cement, steel or glass). He needs surveyors to lay out and mark out, he needs masons trained in cost-reducing methods to train as they build with other local masons, and he needs acccountants to have daily money available for daily work and material purchase etc.

However—it is not the purpose of this letter to suggest schemes and details. It is to say plainly and emphatically that the house building situation is very bad. Government costs are ridiculously high while ordinary people can build for twelve per cent of government costs. The wealthy, the HIGs, the Gulfers and the Singaporians etc. should look after themselves for five or ten years and the government agencies created to produce the needed houses for the state should get down to the actual job of building—constructing, putting up actual houses (and not get others to do it for them) especially for the poor. For this coming five to ten years, let the government only build for LIG and EWS families. If they can't or won't do it they should be disbanded and an organization created that will do it.

Again, I apologize for blowing my top at you, of all people, but I do have a respect for your understanding of 'ordinary people' I also want you to know that I am going to follow through this my 'personal campaign' about this housing situation wherever I feel anything constructive can result we have already discussed these matters at considerable length at Planning Commission meetings in Delhi and with our own Planning Board here, but what is most essential is a change of heart of our own Housing Board. I believe very much that you could guide them to a more realistic policy.

All very good wishes to you.

Yours sincerely,

(LAURIE BAKER)

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6. Laurie Baker, 'Low-Cost Buildings for All', op. cit.
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